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IN THE UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

BLUE CROSS AND BLUE SHIELD OF NEW JERSEY, INC., et al.,

Plaintiffs,

vs.) No. 98 Civ. 3287 (JBW)

PHILIP MORRIS, INCORPORATED, et al.,

Defendants.

CONFIDENTIAL

DEPOSITION OF WILLIAM E. WECKER, Ph.D.
San Francisco, California
Wednesday, September 6, 2000
Volume 2

Reported by:
RACHEL FERRIER
CSR No. 6948
Job No. 112258

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PHILIP MORRIS, INCORPORATED, et al.,

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Deposition of WILLIAM E. WECKER, Ph.D., Volume 2, taken on behalf of Plaintiffs at 400 Sansome Street, San Francisco, California, beginning at 9:05 a.m. and ending at 2:07 p.m., on Wednesday, September 6, 2000, before RACHEL FERRIER, Certified Shorthand Reporter No. 6948.

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San Francisco, California; Wednesday, September 6, 2000
9:05 a.m. - 2:07 p.m.

WILLIAM E. WECKER, Ph.D.,
having been previously duly sworn, was examined and testified further as follows:

EXAMINATION (Resumed)

MR. ANGLAND: Back on the record. By agreement of all concerned, we are going to commence this morning before the videographer arrives. There's a slight delay there, and we will just pick up with the video at such point that the videographer arrives.

Q Good morning, Dr. Wecker. How are you today?
A Good morning.
Q You realize you are still under oath?
A Yes.
Q Did you have an opportunity last night to

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follow up on some of the items that you noted for yourself yesterday that we were going to take a look at?
A Yes.
Q Can you report what you have done.
A Yes.
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In the main, I found that what I had said was -- checked out as accurate, and so I won't bother to go over every point where there's really not a problem. So I'm going to look over the list.
One question you asked was whether Dr. Harrison made any smoking status imputations, and we discussed that and I think I basically corrected my response. But I looked more closely last evening, and I can give you more specifics.
In his first report, he assumes that all missing values for smoking status are nonsmokers. In his second report, he makes the same assumption, but also does a sensitivity analysis, assuming that all the missing smoking statuses are smokers and indicates he finds a small difference, basically consistent with what I told you, but I'm a little more concrete about it.
You asked for me to name some additional variables that are like NMES variables, but are not a NMES. Question is a little vague, but I think I understand it well enough to try to respond.
And so I mention more detailed alcohol consumption, more detailed diet, more detailed exercise, more details on toxic exposures; those would be the first ones and most prominent that would come to my
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mind. And then page 6 of my report lists those and some others.
You asked with regard to the portion of my work where I showed more than 100 percent of smoking attributable fractions or attributable fractions when you look at several things, did I include everything. And we discussed I didn't include age because that has a kind of special status, but I have some others that I didn't include.
I did not include body mass index or income because those are continuous variables. And although that shouldn't stop me from including them if I did further work, I had to change the different categories, and it would be a little bit different than just taking the categories as they come, so I didn't do those. But I can do those.
I did not do blood pressure because actually, through a coding error of Dr. Harrison, blood pressure never made its way to the equations, but I -- so I couldn't do it.
And that's all I have on this one -- in this question I'm to describe, I think my answer was essentially correct, but not all that clear, and so I'm going to try it again.
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The pointed question you asked is, where did I get the car accident probability I used in one of my calculations where I got a SAF of probabilities. And I correctly said that I -- although I wasn't sure at the

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time, but I've checked now, and I'm correct that I get it from the Harrison probit model.

But what I clarify now is that the way that calculation works is, once getting that probability, a SAF is simply the probability from the probit model minus the probability if you change to the less risky category divided by the probability before you change. And that's a SAF. The second question is just not involved.

And so I think if we reread, we will find this is at least consistent, but much clearer if you adopt that. And I've written the equation here. If that's not clear, I can write it on another piece of paper.

Q That is clear.

A Okay. You asked about code in a program called nmesicd9.advars.sas. And at least I found the code. It's in Tab 5, page 3. My answer to you yesterday, I have the same answer today. I believe the way we actually calculated whether an individual was in an accident or not was just to look at the existing NMES

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variable; it says if there's an accident involvement in the expense.

And if you look at the code a few inches down from the spot you directed my attention to, you will see the code doing that. I still have not figured out and will continue to work what that other code is to go up there. And so I won't speculate.

Maybe I will speculate. I think it's probably doing nothing. I think it's probably left over from some earlier case where there was an issue having to do with whether a cigarette might burn your neck or something. But I don't think it's operative. If I find out that it is, I'll let you know.

Q Thank you.

A This, just to add clarity to some answers, when we talked about other insurance coverage, there's some distinctions between how I did that with the older Harrison work and the newer Harrison work that I didn't discriminate last time.

In the newer Harrison work, I'm using monthly determinations, as I said, because he did, and I'm just following the same method he used.

In the older Harrison work, when I was doing that, he hadn't done it at that time, and I used

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quarterly data which is a different variable. No real difference in concept, but I didn't want to leave that unsaid. And for your information, you can find that in Tab 3, page 18.

MR. ANGLAND: Let's pause for a second, so we can turn the video on.

Thank you. Good morning.

(Recess taken.)

THE VIDEOGRAPHER: Good morning. Here begins Tape No. 1, Volume 2, in the deposition of William Wecker in the matter of Blue Cross/Blue Shield versus Philip Morris in the U.S. District Court, Eastern District of New York.

Today's date is September 6th, and the time is 9:17 a.m. This deposition is being taken at the offices

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of Orrick, Harrington & Sutcliffe in San Francisco, California and was made at the request of Joseph Angland of the law offices of Ballantine & Dewey.

The videographer is Paul Rowland, employed by Esquire Deposition Services, at 505 Sansome Street, Suite 502, San Francisco, California 94111.

Would counsel please identify yourselves and state whom you represent.

MR. ANGLAND: Joseph Angland of Dewey Ballantine

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representing the plaintiff, Blue Cross/Blue Shield plaintiffs.

MR. McCARTER: Bob McCarter with Arnold & Porter representing Philip Morris.

THE VIDEOGRAPHER: Counsel, please proceed.

MR. ANGLAND: Let me just note for the videotape that we have been proceeding for a few minutes this morning before the videography could be set up, so there are probably about five minutes of the deposition not reported on the videotape.

So for anyone who is simply watching the tape rather than reading, I refer you to the written document.

Q Dr. Wecker, if you could continue telling us what you found on the issues you were following up on last night, I would appreciate it.

A Okay. Thank you.

We were talking about the other insurance coverage, and I'll continue that.

I had told you yesterday that, as I recalled it, Harrison uses all of the expense, the private insurance expense, even though private insurance might have only been two months of coverage. And I checked on that and, yes, I recalled correctly, that's how he does

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that.

And that's basically the motivation why I included other insurance coverage and indicated what portion of time you had different insurance coverages. Because if you have private insurance for only two months, there would be a tendency that your private insurance expenses would be lower, just because you only had a short term of coverage.

But without the variables on other insurance coverage or private insurance coverage indicating how many months of that you had, the model wouldn't understand that. And so that's why I suggested that variable.

We talked briefly about the new variables for alcohol and drugs, I ilk and I drug, which correct a problem that I pointed out in the old variables, but seem to have a new problem. And I pointed out they seem just too small to be reasonable. And I -- since I had more time last night, I found the output where I show that, Tab 49, page 1.

And then if I can -- I think you may have asked me, but, if not, I'm volunteering, if there was any other problem with those. And I do have another thing to point out there.

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The way those variables are constructed, they are constructed based on the left-hand-side variable. What that could do is it basically guarantees huge coefficients, even infinitely large coefficients for those coefficients. So I believe that is not a good practice to define the probit model, the right-hand-side variables, based on what the left-hand-side variable was.

Q Let me back up on that one, because that's the first one I had trouble following.

Could you run that -- can you explain that perhaps in other words.

A Yes.

Q Let me ask the -- are you talking now about alcohol drug?

A Either one.

Q Okay.

A But consider if the alcohol variable is defined to be one, if there is a certain kind of expense, cirrhosis expense, it isn't critical to this argument what it is, that means that the alcohol variable will be one every time -- every time the alcohol variable is one, there will be at least some expense.

And so if you are predicting the probability of

at least some expense, you will get an infinite-sized coefficient on that variable, which will then be run through the probit transformation to come into zero and one range, but it will try to be a one, which means it will try to be infinite beforehand.

Q Did you have any problem with the second of the two equations in Dr. Harrison's model, the linear as opposed to probit equation, with respect to this particular issue?

A This criticism applies to the first equation.

Q Okay.

A You asked, moving on here, about any other interactions than age and gender. And I had forgotten, but in checking last night in the work on the older Harris model, I also had some interactions with smoking, and they can be found in the same tab, just further.

I don't have a page, but just further in the -- and they are easy to find.

And that's all I have that I checked on last night.

Q Okay.

A Oh, here it is, Tab 14. You can find it on page 62. I wrote it down.

Q What do you find -- well, strike that. We will

come back to that later, perhaps.

Did you ascertain whether you attempted to replicate Dr. Max's results?

A I didn't mention that because I answered accurately. But I did not -- I had done it previously in other cases, but I didn't do it again in this case.

Q Okay. These others may fall in the same category, but did you determine whether you could assess the statistical significance of the SAFs you computed relating to automobile accidents and mental health?

A I understand that question to mean in the -- by

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employing, say, a bootstrap calculation for the SAF, and I haven't done that.

Q Or any alternative technique to compute statistical significance?

A Alternative might be to look at the coefficients in the regression, such as in the case of smoking, just see if the smoking coefficients are statistically significant. That speaks to the issue. It's not an identical test. And one could do that and my regressions would have that in them.

Q In that example, if the coefficients were statistically significant in the regression, but the SAF you computed from it was not statistically significant,

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would you still have comfort in the SAF?

MR. McCARTER: Objection to form.

THE WITNESS: For me this is not an issue of comfort. I believe that with the conditions of your question, the same point that I'm making would still be made, and that is this particular model produces high SAFs in all kinds of different ways.

And some of the ways that are illogical, that you wouldn't expect high SAFs. And so I see it over and over again with automobile accidents and mental expense.

Stop for a moment for the noise.

BY MR. ANGLAND:

Q One could have a statistically significant coefficient for the -- in the equation that you are talking about, even though the magnitude of the effect by a particular variable is small; isn't that right?

A Yes, it's possible.

Q Now, with respect to the SAF you compute for Dr. Harrison -- using Dr. Harrison's model with respect to the impact of smoking on mental health, do you conclude that in his damage computations he overstates damages by including excess mental health expenditures?

A It's my opinion that when he moves from his smoking-related disease -- I think he calls it

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disease-specific calculation. I mean the same thing; I just use a different terminology.

When he moves from that calculation where mental expenses would not be included, so you don't include them erroneously because they are never there to be included, there he doesn't have a problem.

But when he goes to all expenses where automobile accidents and mental disease and all kinds of other expenses are present, potentially ready to be included with his model, that he's going to be including them, and that's why that's such a high SAF.

That's why there's so much additional apparent -- and I say spurious damage that comes from that additional category of diseases which are not regarded as being related to smoke, like mental disease and automobile accidents. I believe he's picking up those expenses.

Q You believe he's picking up the automobile and mental health expenses in his old disease damage number, but not in his disease-specific damage number?

A Right. That's why I credit the approach that looks at the disease-specific expenses and leaves out

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mental expenses, so you don't have the danger of picking up mental disease expenses and automobile expenses.

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Q You testified yesterday that you had found that an interaction term for age and gender was statistically significant when you added it to Dr. Harrison's models; is that correct?

A Yes.

Q I think you said that you didn't believe you had gone the extra step to compute how it would affect his SAF; is that correct?

MR. McCARTER: Objection to form.

THE WITNESS: Let me think. I don't think I said that. If I did --

BY MR. ANGLAND:

Q I apologize. Let me just ask it. I think we discussed the issue yesterday. I can't recall your exact words.

Did you ascertain whether you computed how the SAF was or would be affected by including that term?

MR. McCARTER: Object to form.

THE WITNESS: Yes. I have those. I think it's a number like -- we looked at it even. It was like 3 percent for the smoking-related disease -- maybe -- I don't have it separately for just --

BY MR. ANGLAND:

Q That is the question I'm asking, whether for

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that particular factor you had a separate number. I recognize that, where your 3 point something percent number comes from.

A Right. Now we are looking for a situation where I would make the addition of the interaction variable and make no other changes?

Q Correct.

A Let me give this answer first, because it occurs to me that actually Dr. Harrison in his new work may have actually done that.

Q He did.

A Yes.

Q Actually, I think he did.

A Yes.

Q One of the things I'm doing is seeing if you and he are getting consistent results in some respect.

A I think -- I haven't finished all my calculations with respect to his newest work, but I believe I get that same result that he does.

Q Okay.

A I just do them all together. We could -- if in correction I find that I have that -- I'm sorry.

When I'm reading my deposition, I'll note this. And if I find the tab that happens to have that, I'll

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sure point it out to you.

Q With respect to the smoking status imputation by Dr. Harrison that you talked about earlier whereby in -- for the purpose of his main model, if you will, as opposed to a sensitivity analyses, he treats as a smoker anyone who has a blank with respect to smoking status, do you have any view regarding whether that's an

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appropriate approach?
A I'm thinking either I misheard or you misspoke.
Q It's probably me.
A I can just help with the answer.
Q Sure.
A If we are talking about his main model, not his sensitivity analysis, then I believe he treats the missing values as nonsmokers -- or maybe he does smokers. I have to look back in my notes. Either way I have the same answer.
It's an ad hoc procedure and not with unknown properties and not necessarily a good thing to do.
Q And would it tend -- can you tell whether it is likely to overstate as opposed to understate damages?
A With some analysis you can, but not -- you can't just as a matter of principle. It would depend on what the other variables are, and it's complicated.
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Q Wouldn't it just be injecting noise into the results?
A Oh, no. No. No. It will be systematic.
Q Do you smoke, Dr. Wecker?
A No.
Q Have you ever smoked?
A Not by the usual definitions.
Q Okay. What's your understanding of the phrase "relative risk"?
A It's a ratio of probabilities and wouldn't necessarily be restricted to this, but it's usually found in, say, probabilities of mortality or disease for two different groups of people.
I suppose veterinary science people use it for animals, because it isn't really that restricted; it's just a ratio of probabilities.
Q Okay. And let's talk about relative risk in the context of smokers versus never-smokers, okay?
A Ever-smokers versus never-smokers?
Q Yeah, let's use that.
What would you estimate is the relative risk with respect to COPD?
MR. McCARTER: Object to form.
THE WITNESS: You haven't said yet what the risk is
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a risk of.
BY MR. ANGLAND:
Q I was -- actually, I think you said mortality, I meant to adopt that. We are talking about the relative risk of mortality for smokers to nonsmokers, and more specifically for ever-smokers to never-smokers.
MR. McCARTER: Same objection.
THE WITNESS: No sense in getting into that. Those numbers are printed in the 1979 surgeon general's report based on the CPS2 data, which is data that's commonly used for this purpose.
BY MR. ANGLAND:
Q And do you think those numbers are reasonably accurate?
MR. McCARTER: Object to form.
THE WITNESS: There are some issues there that I'll mention. First there are issues of interpretation. The mortality rates for smokers from a heart disease cause,

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ICD9 code that would correspond to heart disease, should not be interpreted as being caused by smoking, because heart disease is one of those diseases that smokers and nonsmokers get and is thought that diet and exercise has an important role.

So if it's the case, as the data seems to show,

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that smokers have less healthy diets and have less exercise and other risk factors for heart disease, you would expect to see the elevated rate for heart disease among smokers for those reasons as well as, say, a smoking-caused reason. So there's that issue of interpretation to consider.

There's also the issue of the CPS2 data itself. So these calculations are correct arithmetic for the population that was studied in the CPS2 population, but that was not a random sample of the United States population.

So the question -- I don't mean the question from you to me here, but what some person might be interested in if they were really interested in, say, the mortality rates or the ratio of mortality rates for Navajo Indians in New Mexico, then you definitely wouldn't want to use the surgeon general numbers, because those relative risks of mortality rates are different, are not the same in different groups of people.

But with those two major issues out, if one understands that, then it's perfectly sensible to look at those relative risks for what they are.

BY MR. ANGLAND:

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Q Given all that, in your view -- do you have a view regarding whether the relative risks reflected in the surgeon general's 1989 report with respect to COPD are reasonable estimates?

MR. McCARTER: Objection to form.

THE WITNESS: You have to incorporate all my long answer from before. Reasonable estimates of what, is the problem.

BY MR. ANGLAND:

Q Reasonable estimates of how much more likely on average people are to die of a given disease if all you do is change their smoking behavior. When I say, "change," I mean if at the beginning their smoking behavior had been different.

A Oh, no. No. They are not even close.

Q Okay. Now, defining relative risks that way to mean essentially holding everything else constant, the change, what's the relative risk for a group of people if they smoke as opposed to not smoke?

And again, for COPD, what I'm asking you is if you know not what the surgeon general said, but if you have a view regarding what the relative risk actually is.

MR. McCARTER: Objection to form.

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THE WITNESS: I have a view, but I don't have a number for you.

BY MR. ANGLAND:

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Q Tell me your view first.
A It would be a lot smaller than the number that incorporates -- the number you would find in the surgeon general report is the product, the result of all factors that influence heart disease, like diet and exercise, as well as smoking and other things that a medical doctor would be better than I to point to.
And if you want to parse out just one of those, then I know that for one of those, it's going to be a lot smaller. So a lot smaller, I have that opinion, but I don't have a sharp number for you.
Q Do you believe the relative risk is greater than one for COPD?
A You have to say more.
Q I haven't changed the rest of the -- of my question.
A So let me see if I got it, then.
Q I'll put it to you --
A No. I think I've got it.
Q Okay.
A Maybe more coffee will help.

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The relative risk -- I think you'd better ask it. I'm not sure.
Q Sure.
We are talking about the relative risk for COPD, where the two populations being compared are ever-smokers and never-smokers, and the relative risk is of mortality. And we are focusing upon groups that are like, other than with respect to whether they smoked, so that the relative risk as combined would reflect the difference on average in people's likelihood of dying of that particular disease comparing two scenarios, one where they had never smoked and the other where they had smoked.
A So for clarity, the two groups being compared are alike in all respects except for smoking?
Q Correct.
A Okay. And now what's the question about that?
Q Is that relative risk in reality greater than one?
A I don't know. I've never measured that. It's very hard to measure. I don't think anybody's measured that.
Q So all other things being equal, you don't have a view regarding whether smoking increases or decreases

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one's likelihood of dying from COPD; is that correct?
MR. McCARTER: Objection to form.
THE WITNESS: No, I don't have a statistical view of that, because that's -- would require a calculation I haven't done, and I don't believe anybody's done. It's too difficult -- let me just finish up.
BY MR. ANGLAND:
Q I'm sorry.
A That doesn't mean that question cannot be responded to from other perspectives, but not from the statistical perspective.
Q Well, right now I'm just asking for your view, not necessarily your view as a result of applying statistical techniques that you would endorse, but your

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view as somebody who has read medical literature, read the surgeon general's report, reads the newspaper.

Based upon all that, do you have a view regarding whether smoking increases, decreases, or doesn't affect your chance of -- one's chance of dying from COPD, chronic obstructive pulmonary disorder?

MR. McCARTER: Objection to form.

THE WITNESS: I don't even form lay opinions from reading the newspaper. But the best I could answer that is it may well. It's suggested by some things I've

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read, but you don't know for sure. You can't tell it from the statistical data, because you can't disentangle the fact that the smokers are also eating the Big Mac's and watching the TV on the couch instead of doing their exercises more so than the nonsmoker.

So you have this confluence of factors, and you know what the group -- the confluence of factors, the many factors together, you can measure what they do, but you can't piece them out. I wish I could do that. I would be very famous, because that's an important thing that statistics simply can't do right now without experiments. And I think in my lifetime we won't see a method for doing it.

BY MR. ANGLAND:

Q A slight variation on the question.

Do you have a view regarding whether smoking probably, that is, more than likely, increases the risk of death from COPD?

MR. GARNICK: Objection to form.

THE WITNESS: I would have the same answer to that.

BY MR. ANGLAND:

Q Okay. If I switch from COPD to other diseases on the surgeon general's list, would your answer be the same?

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MR. McCARTER: Objection.

THE WITNESS: Yes, it's essentially the same answer.

BY MR. ANGLAND:

Q So I can't remember them all. I remember obviously lung cancer is on the list. You would have no different views with respect to lung cancer?

MR. McCARTER: Objection.

THE WITNESS: Lung cancer is certainly the most prominent example of a strong association with smoking, so I think the view that smoking is a cause of lung cancer that many people suggest is much easier to accept there than it is, say, for heart disease, when so many people who are not smokers get heart disease.

But when you really think about it hard as a statistician, the issues are the same. You can't prove it statistically. You are stuck trying to disentangle other factors there, because even some nonsmokers get lung cancer. And there are other risk factors for lung cancer, so you have a disentangling problem.

So it may be so. I don't say it isn't, but I can't prove it as a statistician.

BY MR. ANGLAND:

Q I'm sorry. I couldn't hear the last few words.

A A statistician can't prove it, that's my point.

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Q My question to you again was not as a statistician; it was as somebody who is a statistician, but has read medical reports and has whatever other sources of information you draw upon.
Given all that, do you have a view regarding whether smoking increases your risk of dying of lung cancer?
A I have the same answer.
Q Which is?
A It may well, but I don't know it. I can't -- the person sitting here is a statistician, I can't make myself something else. So even reading the newspaper and knowing what I know about statistics as well, I have to tell you that you can't -- as much as you might like to say that it's a sure thing that smoking causes lung cancer, you can't prove it with statistics. You would need an experiment to prove it. It may well be true. I'm just saying the statistical evidence is not a proof.
Q Do you have a view as to whether it's more likely than not that lung cancer -- strike that.
Do you have a view regarding whether it is more likely than not that smoking increases one's chances of dying of lung cancer?
MR. McCARTER: Objection to form.
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THE WITNESS: No, I don't have a view in the probability sense. I'm quick to agree that it may well, it may well be true. But I've never seen real proof of it. This is the challenge that's left to medical science in many diseases. Cancer is just one of the areas where we don't fully understand how things work.
BY MR. ANGLAND:
Q Do you believe that smoking is bad for one's health?
A There is essential certainly association with smoking and increased mortality and morbidity, and it's quite possible that it's causal, in which case the answer would have to be yes. But you can't prove that it's causal from the statistics.
So, again, it may well be true. I can't say it isn't true and I don't try to say it isn't true; I'm just saying in my profession we don't know the answer to that. We can just show you the associations.
Q So given what you have just said, you don't have a view one way or the other regarding whether smoking is bad for one's health; is that right?
MR. McCARTER: Objection to "health."
THE WITNESS: I thought I expressed a view.
BY MR. ANGLAND:
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Q I'm sorry. I didn't mean to cut you off there. Had you finished? I was just about to ask, you say you thought you expressed a view; I was trying to make sure I understood it.
The view I thought you said was that you didn't have a view as to whether it was -- smoking was bad for one's health because there were too many uncertainties involved in determining causation; is that correct?
MR. McCARTER: Objection to form.
THE WITNESS: Just because a statistician with

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nonexperimental data cannot prove cause doesn't mean the statistician has no views. That's just a limitation on what views a statistician can properly express.

There still remains plenty of opportunity to say useful things, and I've pointed out the elevated relative risks, the strong associations with certain kinds of diseases. They are elements that are responsive, in my view, to the question of whether there is risk to increased mortality or morbidity from smoking.

There's just a point beyond which it's not correct to go and claim proof of cause if you are a statistician. Geneticists may be able to do it. You may have witnesses here that can do it, but not the

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statistician.

BY MR. ANGLAND:

Q So am I correct that, given all those issues that you have explained in some detail, you personally do not have a view regarding whether smoking is, in fact, bad for one's health?

A I don't have --

MR. McCARTER: Objection to form.

THE WITNESS: I don't have a view different than the one I've expressed.

BY MR. ANGLAND:

Q Well --

A Let me give an example.

Q You can give an example, but I'm going to go back to the same question because I want the jury to hear exactly what your position is on this.

A Okay. I'm trying to be clear. Maybe the example will help make clear what my position is.

Q Sure.

A I haven't looked at this in the last few months, so I hope I get the facts right from memory. But there have been studies of the effect of estrogen therapy for women on certain forms of cancer, and a number of observational studies have been done over the

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years and consistently showing elevated relative risks for certain things.

But finally it was possible to do a true experimental study, and the experimental study showed that the observational studies had simply been incorrect; that the experimental studies were showing no effect and were simply the result of confounding.

So if you can eventually do an experiment, a designed experiment, you can answer questions definitively that cannot be answered definitively with observational data because of the problems of confounding.

In the case of the relationships between smoking and disease or mortality, we don't have the experimental data; we just have the experimental data, observational data.

So the statistician will always warn you that these associations may be strong and they may be, in fact, what you think they are, but be careful, they might not be. You can't be sure without the experiment or without some other scientific input that can finally

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figure out what's going on in a way that the statistician without an experiment cannot figure. That's -- so that's my view.

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Q Let's go back to my question. And let's take it in stages.

I think you have testified that there is evidence showing a statistical association between smoking and diseases; correct?

A Yes.

Q But you have pointed out that associations, statistical associations could be spurious, and they may actually be the result of other confounding factors, not a result of smoking itself; correct?

A Yes. But I'm evenhanded on that. I say they might be causal, they might not be causal; you can't be sure.

Q Okay. So I and the jury have both heard that -- will have both heard that there is -- that you believe there is evidence regarding association, but it may or may not imply that there is a causal link; correct?

A Right. We say almost as a slogan that association is not necessarily causation.

Q Okay. Given all those facts, can you, drawing upon whatever sources -- strike that.

Given all those facts, do you -- drawing upon whatever sources you want to draw upon, whatever you

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think is legitimate to consider, do you have an opinion regarding whether smoking is bad for one's health?

MR. McCARTER: Objection to form.

THE WITNESS: "Bad for one's health" means causal to me. I think that's what you are saying.

BY MR. ANGLAND:

Q And I'm just looking for an answer.

A And I don't have one. I can give you associations. I can't give you causal results without an experiment.

Q I think my own question at the end -- either my question or your answer was a little vague, but I think we are talking the same language now.

When you said you don't have one, I want to make sure exactly what that relates to, whether it's my question -- whether you have an answer to my question or an answer to my question, to the question my question asks you about.

A That was clear.

Q Yeah.

MR. McCARTER: Let me interpose an objection.

MR. ANGLAND: I'll object to it myself.

Q Now, forgive me here, I am going to repeat in a sense what I said about the --

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A Please do. Go ahead.

Q Given all that you have said about association and causation, do you have a view regarding whether smoking is bad for one's health?

MR. McCARTER: Objection to form.

THE WITNESS: Okay. I have the same answer, and

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I'll say it again carefully.
I understand the question, when you say bad for health to mean bad causally; it causes bad health.
BY MR. ANGLAND:
Q Correct.
A And I do not have a view of that because I cannot without an experiment.
Q Okay.
A As a layman, I can make whatever guess I want. I can read the newspaper, I can make reasonable surmises based on how I feel about things. But as a scientist, I'm a statistician, and that's all I am. I can't answer that question without an experiment.
Q Okay.
A Geneticists might be able to do it for you, but not me.
Q Now, the answer you gave me, you were answering as a statistician; is that correct?
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A But that's what I am.
Q Okay. Well, do you have any view other than as a statistician?
A No.
Q You don't have a layman's view?
MR. McCARTER: Objection to form.
THE WITNESS: Not on -- I don't have a layman's view of a statistician's expert question. I have a layman's view of lay things, like whether it's raining outside or something like that. But you have asked an expert question, and so I have to give you the view as an expert.
BY MR. ANGLAND:
Q Okay. In the course of your career, and this may repeat a question I asked you yesterday, honestly I can't recall, have you read a substantial number of studies involving the application of regression analysis to observational data?
A I think we discussed this. And I said let's clarify the question. You probably mean simple linear regression or multiple linear regression.
Q Correct.
A And I said that from time to time I see that in the published literature, but usually it would be a
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minority of articles. It would be 5 percent or less that you would see that.
Q What's your denominator when you compute the 5 percent?
A Articles that cross my desk. I don't -- every time I pick up a Journal of the American Statistical Association, I turn to the first article, I don't see linear regression. It might be a whole issue there and not a single linear regression there.
Q Would the same be true of the Journal of Epidemiology?
A I would be less knowledgeable, because I don't read every page of that one. I just read journals -- articles that come to my attention.
Q Well, given the sample that does come to your attention, can you give us some sense of the approximate number of such analyses, published analyses that you

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have seen in the course of your life? Are we talking five or a hundred?
A More like a hundred.
Q Okay. Which ones do you recall -- can you identify some for me that you recall being, in your view, good jobs?
A You can't -- you really can't tell from a
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journal article. Even if you are a referee, you have to not assume, but -- let me start it again.
You read a journal article that's done some data analysis and they report certain results. You can't tell if it's correct or not just by reading it, because there are issues that don't explain themselves and are not possible to get to understand from the journal article.
You would really need to have the actual data and check for specification errors and other kinds of errors. And that's just not available in the other article, so you can't say whether it's fair or not.
Q Fair point.
You agree that while you can't say something is a good job based solely upon the article, you could, in theory, say something was not a good job based upon the article?
A Yes. I think there's some indicators of not a good job.
Q Recognizing, then, that in praising articles you are limited to what's within the four corners of the article itself, and you can't go back and play with the underlying data and things like that --
A Well, sometimes I do. As an editor, I
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sometimes, when I'm suspicious, I actually require the authors to send the data.
Q Okay.
A Many journals nowadays require the authors to archive the data publicly so that anyone can look at it and check for themselves, so that is something we do. But your earlier question meant -- the way I interpreted it, was just picking up and reading the article.
Q That's right.
So given that caveat that there's only so far you can go in endorsing a study based upon just reading it, which studies based upon what you read -- or can you identify some such studies -- that is the application of regression analysis, as we have been using it, to observational data, can you identify some such studies that you thought were good jobs?
MR. McCARTER: Objection to form.
THE WITNESS: I haven't got any in mind. I don't pay that much attention to observational studies unless it's a subject I happen to be interested in. So to answer that, I would have to sort of go through journals and spend a little time until I found one that I thought looked like a good job, but I don't have one in mind now.
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BY MR. ANGLAND:
Q You say that you don't pay much attention to

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observational studies unless it's a subject you happen to be interested in. Can you think of some of the subjects you have been interested in -- I'm just trying this as a memory jogger device.

Can you think of some of the devices you have been interested in for one reason or the other and identify any good such studies, published studies in those areas?

A Well, let me add a little to the question.

Subjects I've been interested in are mainly theoretical or methodological. So I don't think your question wants me to go into those areas, but into areas where data analysis has taken place. And it's the findings of the analysis of the data that is the subject matter. And so I limit --

Q That's correct.

A -- I limit the question to that.

Well, one area that I've spent a lot of time studying is the effect on health of lead, a pollutant, especially in children. Served on a committee advising the United States Government on its policies on lead contamination.

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And so I spent several years studying that, and I've read almost all the literature that's been published on that and studied and written some myself.

Q And can you identify in that literature any good analyses of observational data involving regression analysis as we have defined it?

MR. McCARTER: Objection to form.

THE WITNESS: I'm partial to my own analysis, but it was much more elaborate than the kind of regression that you are asking about now.

BY MR. ANGLAND:

Q And your own certainly qualifies as an item on the list. We have got -- you identified that earlier. Can you identify any others that you thought were good?

A Well, but let's go back to the -- mine does not qualify as an item on the list, because it was not a simple linear regression or a linear multiple regression; it was something different than that. And we were restricting attention to that.

Q Oh, okay. Yeah, I'm straining to recall your article. That dealt with the missing variable issue?

A Yes.

Q Okay. Fine. Well, then, can you identify any others -- any other articles on the general topic of

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lead that you thought were good that fell within the description we have been using?

A No, I think that was a basic failing.

Q Okay.

A I think the use of simple linear regression or multiple linear regression was inadequate in all the articles I looked at because of misspecifications.

Q Okay.

A And I can -- because I happen to know about that subject, I can tell you exactly what the misspecifications are, why they are important, and if you want to inquire about that.

Q Now, another area in which you have been

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interested is the effects of smoking on medical expenditures; is that correct?
A Some, because of the consulting I've done in litigations, like the one that brings me here, so I've studied it in that context.
Q Okay. And have you seen studies that involve the application -- published studies that involve the application of linear regression to smoking expenditures -- I'm sorry, the application of linear regression to observational data in the context of trying to determine the extent to which smoking affects
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expenditures?
A If there's linear regressions in studies like the Manning Rand study and some of the others that are on a list that I think that Dr. Harris has in his materials which I have with me, I've looked at them.
And so if there's linear regressions in there, I've seen them, but I don't remember and can't tell you which ones are which.
Q Okay. Do you recall any studies involving linear regression as applied to observational data in the context of smoking and health that you thought were good jobs?
MR. McCARTER: Objection to form.
THE WITNESS: I don't understand that. Could you say that again.
BY MR. ANGLAND:
Q We are talking about articles that deal with smoking and its effect on medical expenditures. And I'm asking if you have seen any studies involving the application of regression analysis to observational data in that context that you thought were good studies.
MR. McCARTER: Objection to form.
THE WITNESS: Yeah. I thought I answered that one. I thought you had a different question. If that's -- if
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I understand that, that's the question I just answered.
BY MR. ANGLAND:
Q I thought we were talking about lead before. Now we are talking about smoking.
A Let me just see if I can get myself back on track.
Q Okay.
A I thought -- thinking to my answer, I mentioned various studies, like the Manning study and the other studies, and I talked a bit about those. And I just don't have any more to add to that.
Q That question was just whether you had seen any studies.
A I see.
Q I hadn't asked whether they were good, bad or indifferent.
A Oh, no, you asked if there are linear regressions in them.
Q Yes. I asked if you had seen any studies with linear regression in this context, but I hadn't asked whether you had seen any good studies or bad studies.
My question now is, of those studies that you referred to that had linear regression applied to observational data in the context of smoking and health,

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were there any where -- any of those studies that you thought were good jobs?
MR. McCARTER: Objection to form.
THE WITNESS: I've already explained that although I looked at those studies, I don't remember without looking at them again to refresh my recollection which ones had a simple linear regression or simple multiple regression.
So I can't sort them into piles. So I can't address that. I can tell you which studies I thought were the more interesting and the better studies, but I don't remember which ones had the linear regressions in them.
BY MR. ANGLAND:
Q Okay. That's fair. Let me just take out the word "interesting," because that could mean a lot of different things.
If you could just tell me which studies on this topic you thought were the better studies.
A I thought the Manning Rand study was one of the better studies. I thought the COMMIT interventions that we talked about, which are close enough related to your question that I'll include it, I know that there's slightly different motivations there.
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Q Is that the COMMIT study you cite in your report, by the way?
A Yes.
Q Okay.
A There's maybe more than one article about it, but it's the study where they went around and tried to intervene. And so I think in a few cities in Wisconsin or that area, those are the ones that are the better ones.
But in general, it would be the studies that make a serious effort to control for confounding variables and focus on smoking-related diseases, avoid the problem of the automobile accidents and the mental health getting in.
Q To use your phrase, do you believe that Dr. --
A Oh, I'm sorry. I've got one more.
Q Oh, okay.
A Some lifetime studies I've seen I thought were -- you said not to use the word "interesting," but they are interesting to me because that's the word I mean.
Q Can you identify the studies?
A There was -- no. I can't give you a title, but there was some Dutch authors that -- I can get these for
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you if you really want. There have been a couple of studies that I've seen that have looked at lifetime issues. I just don't have the citations for you. Tell me if you want and I can supply them.
Q I would like that.
A Okay.
Q In your view, did Dr. Harrison make -- I'm trying to use your wording you used to describe Manning -- a serious effort to control for confounding.

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A Dr. Harrison?
Q Yes.
A Yes, I'd say it was serious. I don't think it was as complete as it should have been, but I credit him for doing what he was trying to do. He was clearly making a serious effort.
Q Do you have any views regarding Dr. Harrison's competence as an econometrician?
A I don't have a view about him as a person or a professional. I have views about the work that he's done that I've seen, but not -- I wouldn't generalize those to be views about him as a person or as a professional individual.
Let me add to that. It's not that I can't have views like that. I've never met him. I haven't sat
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down and talked to him. The only thing I have to go by are a couple of reports, so I would be more restrained than to say I had a view that was that broad.
Q Now, you mentioned that you thought that the Manning Rand study was one of the better studies on this topic; is that correct?
A It's been some time since I've read it, but that's what my recollection is, that I thought it was better than some others.
Q And when -- was it good? And I ask that question, just to be clear, in that I suppose you could have 20 absolutely terrible studies, and one of them would have to be the best.
What I'm getting at is whether there is any -- I'm trying to get at, and I'm asking in the context of Manning in particular, whether there's any published literature regarding smoking and health that you find to be a good job.
MR. McCARTER: Objection to form.
THE WITNESS: I don't look at literature in that way. I think it was an advance. I think it was a better effort than many that I had seen, so I guess it's relatively, compared to others, good. But there's a long way to go to try to fully understand these issues,
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so it doesn't get to a complete resolution.
BY MR. ANGLAND:
Q Do you believe that the Manning study reflects a reasonable methodology for estimating the impact of smoking on medical costs?
MR. McCARTER: Objection to form.
THE WITNESS: That's -- it's too much of a broad opinion for me to have. If you really want to ask questions about the Manning study, they would have to be more specific. I would have to get the study in front of me, and we would have to say, okay, with respect to this particular thing here, let's discuss that.
I have the broad opinion that I've given, that it's one of the better studies. But if you want specifics or any further comments, I think we would have to get the study out and start looking at it.
BY MR. ANGLAND:
Q Do you know -- do you have an opinion regarding whether there is any study that does any -- any published study that does a reasonable job of estimating

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the impact of smoking on medical expenditures?
MR. McCARTER: Objection to form.
THE WITNESS: There's probably no study that is perfect, and so some critique and concern would apply to
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any study. But I can give you the indicators that would be necessary. You want me to stop?
BY MR. ANGLAND:
Q Yeah. I mean, if you feel you need to finish you can, but that really isn't the point I'm getting at.
A Okay. Then I'll try to listen harder.
Q The question is simply whether there is anything in the literature, whether perfect or not, that you can point to as providing a good estimate of the impact of smoking on medical expenditures.
MR. McCARTER: Objection to form.
THE WITNESS: Well, I can tell you which ones are the better ones. I can't ever get to the point where I can give such a blanket endorsement, because even the best of studies here is going to have some limitations.
And if I say that, it sounds like I'm saying that there isn't a problem, that everything about it is good, and I'm not going to do that.
BY MR. ANGLAND:
Q Given that, I take it it's your position that there isn't any study that you have seen, at least, in the published literature that gives -- that you can say in your opinion reasonably estimates the impact of smoking on health expenditures?
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A We have -- I would have to interpret in my answer what I would understand by "reasonable." I think some studies certainly make reasonable attempts and are better than others.
But I would not say that anybody who wants to do further work in here might as well forget it because the work has been done adequately, we know all we need to know about the relationships between smoking and health expenditures, so any young assistant professors who want to work in that area had better go find other work because such-and-such a paper has basically done the job. I don't think we are there.
Q Now, in the context of this case, I take it it's your position that Dr. Harrison's model does not reasonably estimate the impact of smoking on health expenditures; is that right?
A Well, he has more than one model. I have -- when it comes to his model that we are -- he restricts to smoking-related diseases as opposed to looking at all costs, like mental disease and automobile accident costs, there -- I think in the second case with the automobile expense, that's not reasonable, that's an error-prone procedure.
Did you want to change the tape? I'll pause
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for a minute.
What I believe to be more reasonable is the work that he did with what he calls the disease-specific model. And especially in his new work, where he's corrected some serious problems that were in his old

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work, he's getting a better and better job, one of the better ones I've seen, certainly better than the Wendy Max job, which has -- you can ask me more about it, but has really serious problems.

But it's still not perfect, and I've suggested some further improvements. And even there I wouldn't claim that even with my recommended improvements that the last word has been said on this issue. I think that other people will come along and do a better job.

Q Yesterday you mentioned that one potential issue regarding Dr. Harrison's model related to the way he developed a probit scaler; is that correct?

A Yes.

Q Okay. And I'm straining to recall here, but I think you said that there were, and these are my words, not yours, some sort of diagnostic test one could do to assess whether the way he developed the scaler was correct; is that fair?

A Yes.

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Q What sort of diagnostic test should one do?

A I'm not sure. That's one I want to explore. It's a hard one. And the usual specification tests are not geared to handle that one. So I haven't made comment about it in my report.

I commented in response to one of your questions, but it is -- it is a part of the specification of the model and so has the possibility of being misspecified and, if misspecified, has a possibility of doing serious violence to the reliability of the result.

I notice no report by Harrison that he has validated that particular specification choice or looked into it. And I think I -- I guess I'm more alert to it since you brought it up, but I've always felt that should be pursued more, and I would like to do that.

Q If you were doing an analysis of the impact of smoking on medical expenditures, and if it was going to be based upon cross-sectional rather than longitudinal data, I'll ask you to make that assumption, what database or -bases would you use?

A I'd try to develop data as part of that project. I'd create my own, in other words.

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Q Do you have any idea what that would cost?

A Probably less than the government spends on the NMES database. But it could cost, I'd say, more than a million dollars to do that well.

Q How long would it take to do that?

A I really haven't thought it through, but it wouldn't happen in a couple months. Just depends on how much resource you put in it. So at the very least a few months and possibly several months.

Q Let's assume for a second that you were constrained to using only existing databases rather than to create one of your own. In that situation, would you use NMES?

A I'm not sure I would be willing to do it. Many times I'm asked to do work and I politely decline because I can anticipate -- or put it the other way, I

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don't anticipate that when I'm finished with the work, I would have favorable comment on what I had done.

I would prefer to do work where when I'm finished, people say that that was worthwhile and helpful. And when I see that's not in the prospect, I just decline. I've probably declined twice as many projects as I do.

Q Can you think of a database that exists that is

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better than NMES for this purpose?

A At the very least, I think the database that is resident in medical files would be an -- would be a necessary addition.

Q Can you think of any existing electronic database that is better than NMES?

A You keep limiting me to the point where you get down to where you can't do the job very well, and I'll decline.

Q I'm not asking whether you decline, I'm just asking if there's a better one. If, for example, there's an absolutely marvelous database at the University of Wisconsin that has all the data and everybody should have just gone and used that one, I want to know.

A No.

Q I'm just asking if you know.

A NMES is a good database because it's a random sample, and that's something that is a big plus. The CPS2 database, though, it's not a random sample, has a lot of questions on diet and exercise that NMES does not.

And diet and exercise are so important to health outcomes that I strain to wonder why the NMES

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people don't ask about diet and exercise in the detailed way that CPS2 does.

So it may be that some combination -- whenever you see elimination of damage, you say, gee, is there somewhere I could go to try to deal with that with another database.

So it may be that a combination of databases is necessary and not just one. But to close out quickly, I really think the better choice is to develop a specialized database for this particular project; then you would be able to ask what you want to ask.

Q With respect to the CPS2 database -- first of all, that's the database that underlies the mortality ratios computed in the surgeon general's 1989 report; is that correct?

A That's right.

Q And you have worked extensively with that database over time, I take it?

A That's true.

Q And indeed, I think it electronically appears in some form in what you have produced to us in this case, or at least some manipulations of it; is that correct?

MR. McCARTER: Object to form.

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THE WITNESS: Some of my analysis appears, but I

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don't believe I sent you the whole database; it's very large.
BY MR. ANGLAND:
Q Okay.
A It's got more than a million people in it, so if you had it, you would know it.
Q Okay. Now, you mention that that database has data regarding diet and exercise; is that correct?
A Yes. Detailed data.
Q Okay. And would that data permit one to test for the confounding effects of diet and exercise?
MR. McCARTER: Objection to form.
THE WITNESS: Yes. It -- it certainly permits you to test for the existence of confounding. It -- and it goes well beyond NMES for being able to partially control in that area. But my appetite for even better data is still present.
BY MR. ANGLAND:
Q Okay. You began working with the CPS data around 1990; is that right? CPS2 data?
A Yes, that's about right.
Q Okay. Have you ever, in your analysis of that data, attempted to ascertain the confounding effects, if

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any, of diet or exercise?
A Yes.
MR. McCARTER: Objection to form.
THE WITNESS: I've done some work, quite a bit of work in that area.
BY MR. ANGLAND:
Q And has that work gone beyond simply showing that diet and exercise are themselves associated with smoking behavior?
A Yes. I think I've done quite a bit more than that.
Q Okay. Why don't you tell me what that is, then, what you have done beyond just showing that association.
A Well, that doesn't by itself get to the confounding issue. That just shows that there are more than one risk factor, because there's an association, say, of heart disease with diet and with exercise and with smoking.
Q I understand.
A So it hasn't quite -- it hasn't gone very far. It's suggestive. And I'm -- there's so much I've done, I'm trying to think, well -- here's a good one. I'll use this example.

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One of the calculations I did to try to assess the importance of these diet and exercise factors -- I'm pausing here to try to say this clearly. The importance, I suppose, has already been done, because the surgeon general has exercise reports and diet reports, and you basically can just read the surgeon general reports and decide that as far as associations with mortality, that diet and exercise and smoking are pretty much on a par.
So they are all important, and it isn't that one stands out hugely compared to the others. But to get to the confounding issue, you want to say, well,

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here's the problem; if the smokers don't exercise as much and have less healthy diets, then if I look at smoking alone, I'm seeing this combination of factors. And how much is that -- is that a big problem or a little problem.

So one thing I did was to use the CPS2 data where I said, well, what if the world was just reversed and it was the smokers who were eating their leafy greens and their broccoli and sprouts and staying away from the fried foods and so on and had the most healthy of diets, or at least a healthy diet, which is contrary to the way the world really seems to work.

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And what if it were the smokers who were running marathons and getting plenty of exercise, and the nonsmokers were the couch potatoes and the ones that went with counsel and me to the heavy meal last night, where we ate too much. Then we could see what level of confounding might go the other way.

And if it's a small effect, that would be interesting; if it's a big effect, that would be interesting.

So I was able to construct a set of data of that kind by simply restricting attention in the CPS2 data to people of the kind I described. And even though there's a tendency for the smokers to be more so into less healthy diet and less healthy exercise, there's plenty of smokers who do have healthy diets and do exercise.

So I could create a group of smokers with good diets and are exercising, compare them to a group of nonsmokers with less healthy diets and less exercise, and the effect was huge, factor of three difference. The smokers were -- had far lower mortality than the nonsmokers by -- I think about a factor of three.

So that's a place where I learned that these confounding factors -- which I rather expected, but they

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can be huge and make the problem of sorting out the individual effects not just something you can assume away.

Q If I understood your description of that process, what you wound up doing was taking smokers with otherwise healthy habits, if I can use that as a shorthand --

A No.

Q Okay.

A I only looked at diet and exercise.

Q Okay.

A Now, when you come to toxic smokers, that same person might work in a lead smelter, but I wasn't -- and that's the problem. The list of unhealthy other factors is a very long one. It's very hard to get them all, but I picked two of the big ones.

Q And I do mean to restrict those to those two. You picked smokers who had healthy data regarding diet and exercise, and you compared them to --

A Healthy behavior, let's say, as reflected in the data.

Q Right.

And you compared them to nonsmokers who except

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for smoking had -- except for not smoking, I should say,
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had unhealthy behavior with respect to the variables you looked at, diet and exercise.

Is that the comparison you made?

A Yes, unhealthy in the sense of association with mortality.

Q Okay. Did you ever compare smokers to nonsmokers holding constant the other two variables, that is comparing smokers with healthy other behavior with respect to these two variables to nonsmokers with healthy behavior for these other two variables? Or did you compare smokers with unhealthy other behavior to nonsmokers with unhealthy other behavior, again focusing on these other two variables?

A Again, I may have done that. It wasn't what I was describing, because I've done quite a few things. So I may have done that, I may not have; I just don't recall. The reason for doing it -- the thing I was describing is designed to pick up the effect in the strongest fashion, so that I could -- I had a purpose for doing what I was doing.

The thing you are suggesting leaves you pretty much back where you started, because you have all the other factors, like toxic exposures and stuff that are going to show up. You have evened things out, hopeful
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in some ways, but you have this long list of other things. You haven't advanced the ball very much in seeing how far the factors go.

Q Wouldn't the approach I suggested advance the ball further in terms if the objective is to attempt to quantify the confounding effect of those two factors, diet and exercise?

A I don't think so.

MR. McCARTER: Objection to form.

THE WITNESS: First my -- I didn't suggest that the particular work I was talking about was an attempt to quantify an unconfounded smoking effect; it wasn't trying to do that.

The -- and -- but I don't think the analysis that you are suggesting in the question advances very much either, because there are so many other factors that you have not addressed. If you could get a lot of factors in, enough factors in, then you might have something.

BY MR. ANGLAND:

Q Are there data in the CPS2 database that would permit you to control for many other relative factors?

A There's some, but not enough to be really satisfactory. And some people have tried that, and no
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one has really gotten very far with it.

Q What's the best -- what is the best attempt at controlling for confounding of the CPS2 data that you have seen?

A This is reminiscent of your earlier questions. They are all pretty deficient. But I thought the work of Sterling was interesting from at least five years ago or so, where he worked with the NMES data, because it's

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a random sample. And he also found from somewhere some income data which is missing from CPS2. So he made -- he had some interesting articles.

Q Did you think he did a good job of controlling for confounding?

A No, I don't think anybody has done that. That's basically too hard, and no one has been able to crack that problem. But people work on it, and they make progress. And he had some good ideas.

Q With respect to the CPS2 data in particular -- strike that.

With respect to the mortality ratios computed using CPS2 data, what would be the most important factors, in your view, to control for to test to see -- to try to quantify confounding effect?

MR. McCARTER: Objection to form.

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BY MR. ANGLAND:

Q When I say, "the most," you don't have to limit yourself to one or two. I realize you could give an infinite list, but that probably wouldn't be very practical.

What would be the most important factors that would strike you?

MR. McCARTER: Same objection.

THE WITNESS: Diet and exercise and toxic exposures are at the top of my list. But the problem is you can't stop there, because there are so many other things. And diet is so complex.

So you can't just say healthy diet, that doesn't do it, because it may just be the high fat foods consumed by women who have a -- who don't eat broccoli or something. Some combination like that might be the really bad thing, and you have to try to sort that out.

So diet's a really complicated variable. But I would start with diet and exercise just because intuition is that those are real important. But then the list goes on for quite a long time.

BY MR. ANGLAND:

Q Would age be a relevant confounder?

A Well, age is a special category. Most

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discussions don't even mention the word "age," even though age has been employed to get a so-called age standardized relative risk. So it's got a special feature.

It would be a confounder if you didn't take it into account, but it's a special variable that is usually treated differently. But that's where Sterling had some different ideas about how to treat age. He didn't care for the age standardizing scheme that CPS2 uses.

Q Do you have -- strike that.

Do you have a view regarding whether over one's lifetime smoking increases one's medical expenses on average?

A I would just refer to people who have done studies to tell you what others have reported. I haven't done a lifetime study.

Q Based upon what you have read in studies others have done, do you draw a conclusion as to whether

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smoking increases one's medical costs over one's lifetime?
A I'd like to -- I'm going to try to answer, but I'm just going to do a preface by saying I could answer a lot better if I had a study in front of me, because I
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don't have perfect recall of any of these studies.
But my recollection is that smokers have lower lifetime medical expenditures than nonsmokers. I believe that's what some people have found. Which is a little different than saying smoking causes, because that's a harder question. But you can fairly easily assess lifetime expenses of smokers; that's just a matter of counting up what their expenses were.
Q Let me limit my question, maybe be more tractable in that sense.
On average over their lifetime, who has more medical expenditures, smokers or nonsmokers?
A I would really like to get the literature out and see what other people have reported, because I haven't done that, didn't do that study. My recollection, even though hazy, was that -- might be that the smokers have the lower lifetime expenditures, but I'll put that as a task to do when I go home and I'll give you a citation. Since I've already promised to do -- supply a lifetime study, I'll try to find one that has that in it.
MR. McCARTER: You want to take a break?
MR. ANGLAND: Sure.
THE VIDEOGRAPHER: Going off the videotape record.
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The time is 10:38 a.m.
(Recess taken.)
THE VIDEOGRAPHER: We are back on the videotape record. The time is 10:50 a.m.
BY MR. ANGLAND:
Q On page 13 of Exhibit No. 1, your principal report in this case, you mention in the middle of the page that both Drs. Max and Harrison claim to estimate smoking attributable expense incurred by Blue Cross plans, but that the estimates are derived from populations other than the Blue Cross population; is that fair?
A Yes.
Q Does that make their methodology unsound?
A Well, it's a deficiency. Unsound is a characterization. I don't know if I would use that term or not, but it's not a -- it's a minus. You would rather be working with Blue Cross data.
Q Would you characterize it as a major minus?
MR. McCARTER: Object to form.
THE WITNESS: You can't be sure. That's the problem. It's a very hard one to assess as to the magnitude of any error that might be introduced, sort of like you have to take it on faith that it's not a
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problem, or you would have to scrap the whole -- your whole reliance.
BY MR. ANGLAND:
Q Do you have reservations about relying upon a

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study in the context of this case simply because it doesn't relate to Blue Cross/Blue Shield populations?
A Yes, I would have to have a reservation. But I can't give you one way or another the opinion of whether it turns out to be a really important problem or not.
Q Would it be reasonable in the context of this case -- even if not perfect, would it be reasonable to rely upon data derived from the study of a population other than Blue Cross/Blue Shield?
MR. McCARTER: Object to form.
THE WITNESS: I don't think it would be best practice unless you also did something to try to show that the fact that you don't have Blue Cross data doesn't turn out to be a problem.
So I would have recommended some side recommendation to look at differences between Blue Cross and the general private insurance folks.
BY MR. ANGLAND:
Q On page 14 of your report at the top, you mention that Dr. Harrison predicts future expenses for

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Blue Cross plans that are inconsistent with past expenses. Do you see that?
A Yes.
Q In what respect were they inconsistent?
A Well, I have an example that would be best to illustrate what I mean by that. Let me see if I can find it.
Q Is that -- are you referring to what's in your file BCBSempire.xls?
A I think so. Shall I look for it?
Q You can if you want.
For example, I am aware that Dr. Harris estimated a faster growth rate for Empire in the future than they had experienced in the --
MR. McCARTER: Harrison.
MR. ANGLAND: Harrison, thank you.
Q I even noticed the same problem in some of the notes of your discussion with Dr. Mayer. I do it myself all the time.
A I believe you and I are thinking alike, but what I had in mind was this chart here, where the actual expenses for this -- I think this is Empire, yes, Empire/Blue Cross -- have followed the pattern that they have been declining for the past near decade, but in the

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future there's at least an inconsistency.
Perhaps the inconsistency can be explained and value dated, but there's an inconsistency in what is proposed for the future and it's dramatic, and it certainly cries out for explanation.
Q Okay.
A On its face it has the suspicious look of a greedy calculation.
Q Why did you single out the Empire plan?
A Because the chart was well-suited to illustrate my point.
Q Did you do the same analysis for the other plans?
A I don't believe I've done it for all of them. I've made this chart.

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Q Okay.
A It was an exemplar. It was not a -- it's one of several. There would be others I could do.
Q Let's shift gears a little bit and talk about Dr. Harris' causation model as opposed to Dr. Harrison's models.
Would you accept the characterization -- let me see if we can get some terminology down -- that Dr. Harris' model involves at least two dimensions, the
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first is creating a series of interrelated equations that includes in those equations -- some of those equations requiring parameters to be inserted, and then the second step being actually assigning values to the parameters?
MR. McCARTER: Object to form.
THE WITNESS: Well, he certainly does some of each. I don't -- probably other aspects of his work that might deserve mention. This is -- but if you want to take the broadest possible brush, maybe it serves --
BY MR. ANGLAND:
Q This is obviously going somewhere in the questioning, and if it's necessary to back up, we can do it.
I understand from your report that you disagree with or question some of the parameter values that Dr. Harris chose; is that correct?
A Well, I didn't use this kind of a classification, so it would take me some time to figure out what my various points are and figure out which class to put them in.
Q Okay. Well, let me try it this way.
Do you agree that in his model Dr. Harris assigns values to the following parameters, the quit
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ratio?
A Yes.
Q The -- actually, the quit rate, I should have said, I'm sorry.
The quit rate, the initiation rate, the relative risk of current smokers, the relative risk of --
A You can't just have relative risk of one thing.
Q Okay. The relative risk of current smokers compared to never-smokers.
A Okay.
Q The fourth would be a measure of the relative risk of former smokers to never-smokers. I actually forget as I sit here whether it's stated in terms of the relative risk itself or simply the percentage of the relative risk of a current smoker to a former smoker, but one or the other, measure of that.
A I think that's lambda.
Q Yeah, I believe that's right.
And then a fifth parameter relating to the rate of decrease in the harmful effects of the cigarette product itself on the assumption it was going to become safer as time went on.
A It's parameter mu.
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Q Yes, I believe he used mu.
A Well, at least those. There may be some more; I would have to check.
Q Why don't you look to see if you can recall any others.
A Well --
MR. McCARTER: Are you differentiating between the quit rate in the actual world or quit rate in the -- or combining them together for this purpose?
MR. ANGLAND: For this purpose combining them both together.
THE WITNESS: I made a little list just like the one you are doing and I have the same list.
BY MR. ANGLAND:
Q All right.
A Okay.
Q So Dr. Harris' model doesn't involve assigning values to those parameters that we have just talked about and that are on your list; correct?
A Yeah, speaking broadly. There's, of course, a lot of details.
Q Right. And what I'm trying to get at is whether you have any criticisms of Dr. Harris' model other than the values he assigns to the parameters. And

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if you need to look through your report, that's really fine.
A Well, that's an odd question because you have the report. Let me just say it this way: I have all the opinions and points that I made in the report. And whether they fit your classification scheme or not, I'm not sure, but they are all here for you to read.
Q And to be sure I have read them and nothing we say is going to take them away, I'm just trying to make sure that I understand exactly what you are doing in the report.
As I read the report, I didn't -- what I saw is that you had numerous objections to the values that Dr. Harris ascribed to different parameters and showed how, if you alter them, there would be a significantly different conduct attributable fraction.
I didn't see in there, and I want to be sure I didn't miss it, anything that said that the structure of the model itself was wrong.
MR. McCARTER: Object to form.
THE WITNESS: Well, let me look through and see if I can find something that would --
BY MR. ANGLAND:
Q Sure. If you need to take a few minutes, by

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all means.
A Okay. Just a minute.
I can see -- I've read through. I can see why you have adopted this point of view, because -- it's reasonable based on this reading because you could -- though I didn't think in these -- this particular distinction when I was writing it, I suppose you could make that distinction and decide to call this stuff parameters.
Maybe the -- but I think we should say what is this other thing that I've not commented on, because

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"structure" is kind of a vague term.
Q Well, for example, Dr. Harris has a series of different equations that he uses -- that he computes and then eventually -- and they are expressed in terms of these parameters, but he does some pure math, if you will, before he gets to assign values to the parameters.
A Yeah, I don't disagree with the difference equation.
Q Okay. Then once he has got the results of that difference equation and assigns value to the parameters for his but-for world, he does a subtraction that involves comparing the but-for world with the actual world.
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And again, you may disagree with his parameters on the real world, but you disagree with the structure?
MR. McCARTER: Object to form.
THE WITNESS: See, this is not natural for me, this classification. But we are both doing our best here. But here's a helpful answer I think.
You mention a subtraction and a comparison between a but-for and an actual. And it's reasonable to think of that as structure as opposed to parameter, and I don't disagree with that.
BY MR. ANGLAND:
Q You said you don't disagree with that?
A I do not disagree with that.
Q Okay. Let me try it from another way.
If Dr. Harris or you supplied the correct parameter values for the five variables we talked about, and if we were in agreement on smoking prevalence in the real world, then would his model produce reasonable results, in your view?
MR. McCARTER: Objection to form.
THE WITNESS: I think that his model oversimplifies, or at least simplifies even if you had agreement, as to the value of parameters, so that with this model there could still be questions that could be raised about
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areas where groups of people have been aggregated or phenomena have been looked at at an aggregate level that might be more accurately appreciated at a disaggregate level. That could always happen.
BY MR. ANGLAND:
Q Do you have an opinion whether the failure to consider things in a more disaggregated level in that respect, whether that alone renders Dr. Harris' model unreliable?
A I would have to think about that more. It's not the way I've approached it. I've tried to address his model on its own terms, and therefore, if he has initiation rate, then I address things pretty much in the same context that he has.
But -- I'm making a note here. It may be that if I thought more about that aggregation point, which is a common concern with how -- the aggregate models, that there would be some new concern that would arise that I hadn't highlighted so far.
Q As you sit here today, though, you don't have a view on that subject one way or the other?
A No. I can't think of a -- well, I do have a

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view, that the model is highly aggregate, and highly aggregate models are prone to errors because of the

nature of the aggregation.

And that -- and I have the view that that may well be important enough here that it would be -- rise to the level of a serious concern. But I hadn't thought about it very much until you raised it here. I'd have to think about it more.

Q Okay. On page 14 of your principal report, Exhibit No. 1, at the bottom you mention that Dr. Harris derives a parameter value for relative risk for current smokers, let's start with that, from his review of the literature rather than using relative risk computed by Dr. Harrison or Dr. Max.

Do you see that reference?

A I haven't found it yet, but --

Q It's the very bottom paragraph on page 14.

A Yes, I see it. You are paraphrasing. Your paraphrase is good, which is why I didn't quite see the --

Q Okay. Fine.

Does Dr. Harrison compute a relative risk for current smokers?

A Well, it's implicit in his calculation. I don't think you can find it in a table, but he -- if you look at Footnote -- I think it's Footnote 63, he shows

how to -- how he does that.

Q That's for ever-smokers, isn't it?

A I believe so.

Q And my question was current smokers.

A Let me think. I'm not sure. I would have to look at the details of his output.

Q Let's stick with the --

A I'm going to make a note on it.

Q Sure. I'll give you a second.

A Okay. I'll try to think of that and look at the documents during a break when I have more time. Maybe I can answer it while I'm still here.

Q Okay. How sensitive are Dr. Harris' computation of the conduct attributable fraction to his choice of the parameter value for the relative risk of current smokers?

A Let me look at one of my outputs here and see if I can tell you.

Q Sure.

And just to -- while you are looking, I want to focus just upon changing that parameter value in isolation. I realize there are various places where you combine several of them at the same time, and I'm trying to isolate that effect.

A Right.

Okay. I think I've found that.

Q First of all, where is it?

A Okay. I'm in Tab 32 on page 1, about three-quarters of the way down the page. And I have -- let's see. There's numbers on the items. It's Item No. 13. And I look in that case only -- the only

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difference I make is a change to his relative risk.
Q Is that just the relative risk for current smokers?
A Let me look in his models. The way it's set up, it's a single number. And I think -- first let me report the result there before I lose track of it.
Q Sure.
A It seems to be a large effect there.
Q And what number -- just so I'll be able to interpret the page, what number do you deduce the large effect from?
A The percent reduction in his CAF.
Q And what is that?
A It's 22 percent approximately, so it's not a little bitty effect.
Q That's a 22 percent reduction on the CAF stemming from what change in the relative risk for

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current smokers?
A Well, there's a detail we have to fix. There's a single parameter here that I'm working with called relative risk, and I have to verify that it's current smokers, because I don't have a subscript here. But it's in his model, so I just didn't remember.
I have to check another page to verify that it's current smokers. But it's the -- it's the one here that I've called relative risk, and I just didn't jot that it was current or not. I left that unstated.
But that's the calculation. And then I run it through his equations. And so I'm just using his calculation, and I've changed the value of that one parameter.
Q How much had you changed the value of that parameter?
A I said it would be the -- set it to be the same as the baseline, so I could assess what is the effect of that parameter.
Q "The baseline" meaning the 1953 or '54 value?
A It's more complicated than that. This is an over-time calculation. It's very complicated.
Q Can you describe the calculation?
A Well, I can direct you to his report where the

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best description is, but I have a printout of the calculation in full detail for -- I didn't print out every case, but I printed out one at least, so you can work through the complete calculation.
Q Okay.
A It takes 12 pages to do it.
Q Now, you may have already done this, but could you give me the page reference for the section you are talking about now, just so I know how to find those 12 pages?
A Sure. It's Tab 32. The first page looks at the effect of a lot of different things, but it's Item No. 13 that looks at the effect of the relative risk parameter as opposed to the initiation rate or the -- these aren't just parameters. That's the problem. They are not just single numbers. They are sequences through time.
So let's not call -- I don't think I'll call it

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parameter, but it looks at the initiation rate input, we will call it, the quit rate input, the relative risk input, and the mortality differential input. He calls them by the letter mu, g and h and rr. So that's what's on the first page.

And then it continues on to the second page.

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And then I print out one example for one of them, and I would have to study which one it is, that goes on for the rest of the 12 pages that shows all the details of what you calculate, the intermediate outputs of his calculation.

But the -- and I've annotated it in a way that should be clear to you so it isn't just going to be a mess of computer output. And with the understanding that I'm using his program, having called mprogram.do, which is -- at least that's one of him. I just use his program with that one change.

Q In Footnote -- strike that.

On the top paragraph on page 15, you say, beginning in the middle of the paragraph --

A Just a second while I catch up here.

Q Sure.

A Tidy up. One more second.

Okay. I'm going to listen now.

Q Okay. I'll start again.

On the top paragraph on page 15, you mention that you compute some SAFs using one of the articles that Dr. Harris cited. Do you see that reference?

A Yes. Yes, I see it.

Q Which article is that?

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A That's the Manning article.

Q In the next paragraph you talked about using Dr. Harrison's regression analysis to determine the long-term effect of quitting smoking. Do you see that?

A Yes.

Q How did you go about doing that?

A Let me read this. One second.

Q Sure.

A I show those details in Tab 25. And what I'm doing here is using our values from Harrison and substituting them in the Harris calculation. I'm reading as I'm talking so I'll get more points out as I go.

Displayed on the first page of that tab are the Harris CAFs for comparison, and then if you substitute the Harrison R values. And it shows a difference there, and you can read it on the page, if you like. Won't take the time to read the numbers.

Q But how actually did you compute the R value for Harrison for long-term quitters, I think is the phrase you used?

A Those calculations are in the next five pages, and let me just review them.

Q Sure.

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MR. ANGLAND: While the witness is looking we can have our tape change right now and save a few minutes, so why don't we do that.

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THE VIDEOGRAPHER: Going off the videotape record. The time is 11:22 a.m. This is the end of Tape No. 1.

(Recess taken.)

THE VIDEOGRAPHER: We are back on the videotape record at 11:26 a.m. This is the beginning of Tape No. 2.

THE WITNESS: Okay. I think it's complicated. It runs across three different tabs.

BY MR. ANGLAND:

Q That's one of the reasons I'm asking the question.

A I will try and lay this out, and if I'm not successful or I've left you with further questions at the end, I invite you to work through, Counsel, I'll be glad to clear it up.

Q Thank you.

A Here's my best attempt at the moment. The calculation, yes, is in Tab 25, but it's not all there. You can't figure it out from Tab 25; you have to go to some other tab.

Q You have already made me feel better.

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A Because it doesn't show anything about how to do the relative risk. I'm going to come to the calculation here, which will be in Tab 28, as far as the relative risks are concerned.

But just by way of background, basically I'm implementing formulas that you can see in Footnote -- I think it's 63 of Harrison's first report, and there's a table that I'll find for background here. This will be helpful. Okay.

It's -- important background is the formulas that you can see in Footnote 63 of the Harrison first report, page 138, and the table on page 145. And the -- you need to put those two together to see that you can take a Harrison SAF -- pause while they knock here.

But through the use of those two spots, you can see how to take an overall SAF and turn it into a smoker SAF, because that's laid out on Table 52. And then through this formula, one over the quantity one minus S, where "S" is a smoker SAF, you can turn that into a smoker relative risk.

And so I believe that's the essence of what I've done. But when you want to find -- when you are actually doing it, you go to Tab 28, where I have calculated a current smoker relative risk of 1.149, it

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appears, and a former of 1.109.

Q Is that all former or a long-term former?

A Long-term former. Six plus years, I believe.

Q And the step I'm getting at is sort of the step in the middle between the part you described. Unless I misheard something. I understand how you can use a formula relating to SAF to go to a relative risk number algebraically. But how did you actually compute the SAF for long-term smokers?

A It's right here. Just a moment.

You need -- it's -- it requires no additional calculation for me in at least one sense, because it is embedded in the Harrison calculation, which he does person by person.

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But you have to print it out because it's not a criticism. The Harrison report isn't going to print out everything; it would be too thick. So what I have to do is print in -- print statements to summarize in this case people who have quit six plus years ago.

And I displayed that on page 3 for the SAFs now, page 3 of Tab 28. So it's just the average of the SAFs for those people.

Q Simple average or weighted average?

A Weighted average in the same way that he does

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it.

Q Weighted by expenditures?

A Weighted by expenditures, I believe. That's shown on those two pages that we studied the other day that shows algorithm. I'm using his computer form, so it will have his method in it.

Q All right. Let me back up to the top of page 15 again for a moment.

In the last sentence of the top paragraph, you say that the SAFs that you calculated --

A One second. I'm not with you yet.

Q Okay.

A Let me tidy up here a bit.

Okay. Where are we?

Q The top paragraph on page 15 of Exhibit 1, the last sentence you mention certain SAFs that you computed from what you said was the Manning study?

A Yes.

Q What were those SAFs?

A I've written a note here that says, if I can read my own handwriting, looks like 10.59 percent for the disease-specific SAF. And I would expect, I won't take the time unless you want, that if we go to the Footnote 42 you can find the details of that.

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During the pause, I looked it up, and you can find the work paper on that in Tab 21.

Q Thank you.

If you will look at the bottom paragraph on page 15 that spills over to page 16 in your principal report, which is Deposition Exhibit No. 1, it refers to a certain sensitivity analysis that you performed involving relative risks. Do you see that?

A Just a moment. Yes.

Q First of all, what is the -- strike that.

Can you tell me where in your binders I would find the output that shows the substantially lower CAF, it's all CAF?

A I hope I didn't misunderstand you earlier, but that's what I thought we were talking about earlier. It's in Tab 25, page 1.

Q If I recall correctly, we were talking before you said you had changed Dr. Harris' relative risk by using a baseline assumption.

A No. That was -- that's not this one. That's a different one.

Q Okay.

A That's Tab 32. Let's ignore what I thought I heard earlier, because I'll just answer this question.

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Q Okay.
A And the answer is you find that on Tab -- on the first page of Tab 25, where I've two things to compare. One is a replication of Harris as it comes, so these are Harris numbers, even though I printed them, and then the alternative of what you get if you substitute Harrison's relative risks as implied by SAFs or that kind of elaborate backward calculation to get relevant risks.
Q Let me try it this way.
You mentioned a sensitivity analysis in the middle paragraph on page 15, paragraph that ends with the conclusion, "This yielded a substantially lower overall estimate of the CAF." Do you see that?
A That's really the same thing. Looks like I said it twice.
Q That's what I'm getting at. You had two consecutive paragraphs, and I was asking about each of them. And it's, if you will, not a typographical, but an editing glitch?
A Looks like some kind of redundancy at least.
Q Okay.
A Let me just read it and make sure it's not a subtlety.
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Q That's all I'm trying to find out.
A Okay. That's the way it looks to me. Let me just read it.
They appear to be referring to the same work.
Q They cite the same file I see, but I didn't know if they were different analyses embedded in the same file.
A No. In this Tab 25, the first page -- oh, I see. Just I think if I point out Tab 32, I'll have covered things.
Q Okay.
A It's -- we were there before, so there's -- there's two places where I make changes to the Harris models; one of them's Tab 25, one is Tab 32. And let me just look to see if there's anything in Tab 32 that would naturally fit the language of the report there. I'm going to take a look through the 25 scenarios here to see if I find one.
Q Okay.
A Well, we have got 24 different variations by changing the inputs of Harris in Tab 32, but none of them that I would think of as fitting that sentence. So it's the Tab 25. And so maybe I've referred to the same thing twice there.
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Q Okay. And just to be clear, what you think may be the same thing twice would be the analysis referred to in the middle paragraph on page 15 and then on the following paragraph, which spills over from 15 to 16?
A Yes. It's -- when I read those two sentences, they read the same and they point to the same footnote, but I think I've also pointed out to you in the broader context that there's two places where you will see variations.
And even though it appears that those -- right

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now those sentences are pointing to the variations in Tab 25, you should just bear in mind that I've got a hole bunch more in Tab 32 and not lose sight of that. They don't appear to be the ones I have in Tab 32 at that point. That's where you find my variations.

Q Switching for a moment to Dr. Harris' computations of smoking prevalence in the actual world, do you have any view regarding whether Dr. Harris overestimated actual smoking prevalence?

MR. McCARTER: Objection to form.

THE WITNESS: Well, it isn't that simple because it isn't one number. There's a whole sequence that he estimates.

BY MR. ANGLAND:

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Q Let me make the question more specific, then.

Do you have a view regarding whether, for the nation as a whole as opposed to state-specific estimates, Dr. Harris overestimates smoking prevalence historically for any age/gender grouping?

MR. McCARTER: Objection to form.

THE WITNESS: Well, I'll try to answer that.

I've got a long section on Dr. Harris' smoking prevalence estimates beginning on page 16. So if my answer now doesn't hit every point in there, you still have those to inquire about if you want.

Here's the essential feature, though, of what he did that I am critical of. He's got some prevalence data, and if I look for a minute he actually has a chart of it, and he doesn't have the actual prevalence data for all time periods.

And so he uses a sort of complicated regression procedure to try to deal with those missing values. And the result is of that procedure, and I think not necessarily what the prevalences are in actuality, is something he calls a dramatic decline in an early period, in some of his language, I believe, dramatic decline.

And even though those are labeled as actual,

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they are products of some data and some modeling. And there I believe the -- that dramatic decline that he points to is really an artifact of his modeling because I can see how modeling has done it. And I look at other places where I have prevalence, and I don't see his dramatic decline.

I hope I'm talking about prevalence here with dramatic decline. I probably should get out the tables.

But so that's the overview, and maybe I should pause for another question.

BY MR. ANGLAND:

Q Yeah. Why not.

A Or if you will permit me, let me just look over my own report here on the -- my comments on his smoking prevalence estimates, and maybe other things will come to mind that I'm overlooking.

MR. McCARTER: I take it by your question you are not limiting it to his -- the one expert report that we have been talking about for a while, but his opinions, whether in either of the two expert reports he's produced?

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MR. ANGLAND: I guess I'm talking about his prevalence model, just trying to estimate real world prevalence.

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MR. McCARTER: Before the questions were in the context of Dr. Wecker's first expert report.

MR. ANGLAND: I'm sorry. I thought you meant Dr. Harris' two reports.

MR. McCARTER: Right. And I take it by this question -- I just reviewed it. It seems broader. It just encompasses opinions, wherever they might be.

MR. ANGLAND: That's right.

MR. McCARTER: Okay.

THE WITNESS: Yeah. I can -- it's -- I can see where it took me several pages to write this. There's a lot to it. The dramatic drop I was talking about is a term he applies to initiation rates, but then that's in turn connected to prevalences through these difference equations, and so prevalences and initiation rates and quitting rates are all interconnected.

So I have -- I've been critical here about the way he's gone about that, and I compared the results he's gotten to prevalences that I can see elsewhere, reported, say, in the surgeon general's report. And I think he's not consistent with what they have got, and so I think he's probably wrong.

BY MR. ANGLAND:

Q In your answer a while ago, you -- let me try a

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layman's interpretation of a portion of your answer and see if this characterization works. That Dr. Harris had some data for the -- regarding smoking prevalence for a relatively early point in the period around 1954. He then had data for some later point, I believe, in the 1960s.

You questioned -- and he didn't have data for the interim period, and you questioned the way that, in effect, he drew the shape of the curve connecting the two of them. Is that one of your criticisms?

A Yes.

Q Now, if we go to the same two end points of that period where he did have data, do you believe that the earlier end point was wrong?

A That confuses me.

Q Dr. Harris had data points for the beginning and end of the period, the middle of which where he drew a curve to fill in the gap in data. What I'm asking is if you disagree with the numbers he used for the beginning point and the end point.

A No, that wasn't my criticism. It was how he filled them.

Q I understood that was your criticism. I wanted to make sure you didn't also have a criticism of the

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beginning and the end. I didn't see it in your report, I just wanted to make sure.

A Well, it might be that there's something lying there that I haven't picked up, but it wasn't -- my point was how he filled it in.

Q Okay. And then if we go forward in time for

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additional years, past the mean '60s all the way to the year 1998, which is, I think, the last year for which he used data, do you have any disagreements with his estimate of smoking prevalence in those years?
A Actual prevalence, you mean?
Q Actual prevalence.
A Well, I'd have to get out the surgeon general's report, which has smoking prevalence estimates and just set the two side by side. And to the extent that they disagree, I'd say that raises a question that one of them might be off.
And since the surgeon general -- I think I would credit the surgeon general prevalence estimates, as I recall they were -- I guess I would have to study them again, but I think at least if the two were not the same, it raises a question.
Q Yeah. To be clear, I'm not asking you to verify Dr. Harris' statements sitting here in the room.
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I'm just asking whether you found in your analysis anything wrong with them, his actual-world prevalence numbers for the period other than where there is this gap in the data.
MR. McCARTER: Objection to form.
THE WITNESS: Well, I'm -- I don't have in my head -- I knew -- I have criticisms about his prevalence data. I haven't broken it down mentally into the different years, so it's a bit of a groping answer to say that.
What I would like to do is compare the surgeon general's numbers to his, and if they don't agree, then I guess in the years you are talking about, I guess there would be an issue there.
But I don't have all that in front of me, and so I don't have the perfect memory of how they compare.
BY MR. ANGLAND:
Q That's an analysis that you haven't done?
A It's not a real analysis; it's just a look at the two graphs. I've looked at them before.
Q I don't mean to overdignify it, but that's a chore that you have not --
A No, I have done that. I have looked at them both. I just don't recall how they match up in later
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years.
Q Did you look at them in conjunction?
A Yes, I've done that.
Q You don't recall --
A No. There's a lot here, and it's not one that I remember exactly. I remember the first part having -- that I've explained having to do with his modeling. It's just a little more fresh in my mind and a little -- how the second part of his data looked, I would have to double-check that.
Q Can you find in the two or three pages that you devote in your report to this issue any criticism of Dr. Harris' real-world smoking prevalence estimates for the period other than that early period where there was gap in the data?
MR. McCARTER: Let me object. Are you referring to just the first report or first and second reports?

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MR. ANGLAND: First and second reports.
THE WITNESS: Well, shall we do a break? Probably a five-minute job here.
BY MR. ANGLAND:
Q Sure. Why don't we do that.
A We are coming to lunchtime anyway. Why don't we do a lunch.

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MR. ANGLAND: Yeah. This would be a convenient time to do lunch.
THE VIDEOGRAPHER: Going off record at 11:54.
(Lunch recess was taken at 11:54 a.m.)

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AFTERNOON SESSION 12:41 P.M.
THE VIDEOGRAPHER: We are back on the videotape record at 12:41 p.m.
EXAMINATION (Resumed)
BY MR. ANGLAND:
Q I think when we broke, Dr. Wecker, there was a question on the table roughly to the effect of whether you had any disagreements with Dr. Harris' actual-world prevalence estimates other than for the period of the gap where he tried to extrapolate the prevalence in the interim period for which there was no data.
Have you had a chance to look back over your analysis -- your reports, rather?
A Yes.
Q Okay. Do you have any objections to his prevalence estimates other than for that period?
A Actual prevalence?
Q Actual prevalence. And by "actual," I'm -- I would exclude, unless you want to add it into the question, that we are not talking about the future, because that's actual; correct?
A Actual not yet, to happen.
Q That is a projection.
A So I don't believe that I mentioned any other

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points of criticism about his actual prevalence with that understanding. I still think it's sensible to

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compare it to the surgeon general, make sure they line up pretty well.

But that's not something -- I think if -- knowing that I've done that, if I saw a discrepancy, I expect I would have written it down, and I didn't see any other points.

Q Now, let's focus on the future projections in the actual world.

A Yes.

Q Did you have any disagreement with those estimates by Dr. Harrison?

A Yes. I believe I have some points on that -- written in the report.

Q And in particular, let me focus upon prevalence rates rather than the initiation or quit rates that are taken in conjunction that baseline numbers can generate different prevalence.

So with that in mind, do you have any criticisms or do you reach the conclusion that his prevalence projections through the 2009 are inaccurate?

A I think I do have some comments there.

Q Okay.

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A It will take me a second to find them.

Q Sure.

A I'm looking at the section beginning at the bottom of page 17, where I describe at some length issues with actual prevalences of Dr. Harris, though I'm reading along as I try to answer.

The second bullet point is talking about a future prevalence.

Q And the third bullet point as well; right?

A The third.

Q Are those the only points in your reports where you disagree with Dr. Harris' projection of future, actual-world prevalence?

A Yes. Those are the only points, but it might be a good idea to look at the tab that the footnote sends us to and just see if there's anything more in there.

Q Sure. Why don't you do that.

A I'm seeing 21 pages of printouts of his various prevalences. I can't be sure that everything that's here that's circled and commented on in the tab is mentioned in the report.

But I see, for example, some negative future prevalences, and perhaps I mentioned it somewhere in the

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report; but if not, I'll mention it to you now.

Q You do in the top bullet on page 18 mention the negative prevalence rates are impossible.

A Yes. But that bullet point is referring to 1955 through '66, and I'm looking in Tab 25 here where I have these detailed printouts, and I notice I circled some negative prevalences in future years.

But I don't think I have any major points to add other than the ones that I've indicated in the report and the detail -- there's just -- I'll just show you. There's a chart showing the details of these prevalences.

I circle -- for example, I show increasing

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prevalences in some categories where others are decreasing. It just raises a question. But I don't claim to know what the prevalences are going to be in the year 2020. That seems like a very hard thing to know.

Q Did Dr. Harris --

MR. McCARTER: Objection.

THE WITNESS: Could you complete that.

BY MR. ANGLAND:

Q Did Dr. Harris purport to know what prevalences would be in the year 2020 and in the work he did for

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this case?

A Well, his numbers proceed as if they know. They have numerical values for years way into the future.

Q Okay. You mention one thing you might do is compare Dr. Harris' data with data reported in the surgeon general's reports in the area of prevalence and initiation and quitting.

Do you have an opinion regarding whether the surgeon general reports are a reliable source of information on initiation rates and quit rates?

MR. McCARTER: Objection to form.

THE WITNESS: Well, I'm -- that calls to mind that some other experts have commented on that. I just wanted to look at my notes on that.

BY MR. ANGLAND:

Q Sure.

A I see it was Dr. Samet who said in his deposition that, in his view at least, the surgeon general prevalence data is authoritative. You were asking my view, but it's -- I'm answering broadly at least.

I think my view would be if you see two sets of estimates and they disagree, you reflect on that. And

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you wouldn't necessarily credit one over the other, but in this case the surgeon general report seems to get a lot of support from many people and probably gets the nod.

Q Now, you mentioned when we all came in from our lunch break that you had some more information regarding ICD9 codes and your IBE analysis.

A Yes.

Q What is that?

A The most vexing question of our enjoyable time together here has been the one you asked about the computer program with the name of nmesicd9.advars.sas, because there was some couple of lines of code in there that suggested that when I was doing my automobile accident analysis looking at the incidents of automobile accidents, that somehow a certain expense categories would either be included or excluded. And I didn't recall it that way.

So I told you that that's not what we were doing here. I was quite sure that I was simply using the code for automobile accident involvement that is already present as a 01 variable in the NMES data set.

And if it shows automobile involvement, I was showing there was automobile involvement for that

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person. Now, I can confirm that that's true and explain that the program with the long name, that the program with the long name that I named was not used.

Though it might appear to be related, it was simply not used for my automobile calculation. And it's a legacy of earlier work where prior to the time that I believe some of your experts said that automobile accidents are not caused by smoking.

I think I should check my notes again, but it might be Dr. Burns who says that. But your -- I believe that's a point of one of your experts in agreement with my point, that automobile -- that smoking is not going to cause an automobile accident.

And by just looking at the incident of accidents, leaving aside how much the treatment costs, you separate out the issue that some experts for plaintiffs have said about it costing more if you have a broken bone if you are a smoker.

But just the incidents -- that would not be caused by smoking. And so sometime after that issue was made into a separate issue, we went on and used a different method than that earlier code that never got used for automobiles.

If you like, I can tell you the program that
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did get used.

Q Sure.

A That's "nmesa" -- the letter "a" -- ".advars.sas." And it's in Tab 3.

Q If you could take a look at what has already been marked as Deposition Exhibit No. 4, Dr. Wecker.

A Okay.

Q I think, if I recall right, as we were closing yesterday I got a very short description, which is all I asked for, of this particular exhibit. And I would like you to just in a little more detail decipher it for me.

First of all, let me ask if the graphs that are plotted after the first page of Exhibit No. 4 correspond to different scenarios depicted on the first page.

A Yes.

Q Okay. In that case, probably all I'll need is an explanation of what the scenarios are on the first page.

A Okay. I'm sure you are familiar with the notation that Dr. Harris has employed that are on this page with the letter g and the letter h. And g would correspond to the Harris' sequence of initiation rates as he would employ them and --

Q I'm sorry. If I can interrupt for a second.
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Are you talking about in the counterfactual world, the actual world, or both?

A G gets used for all of them, but just g plain by itself with no further notation would be an actual. The g1 prime that you see just below g, that is the prime, is meant to indicate in an alternative or counterfactual world. And the "1," "2" and "3," those are my notations for three different versions.

Now, in Tab 32 -- this is all meant to help

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clarify the first couple of pages of Tab 32 -- you will see that g1 prime gets used in certain scenarios. But the main problem is the typing is so small, if you are as old as I am, you can't read it without a magnifying glass, so I tried to clarify that.

So let's just do the first one here and see if that will serve. G1 prime -- well, I picked a hard one. Let me pick g2 prime, because it's a little faster.

Q Sure.

A G2 prime is simple because it's the same as g for the early years up to 1963, and then after that it's simply reduced by a roughly 10 percent factor, exp to the minus .09. And get your calculator out and see what that is.

Q And is that factor drawn from Dr. Harris'

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analysis?

A Yes. Yes.

Q And that's the factor that leads to the 8.6 percent compounded decline?

MR. McCARTER: Object to form.

THE WITNESS: I'm not sure of that. I don't recall it was 8.6 percent, but it's exactly a factor that you can find from his reports printed there. I'm not sure of the page, so I'll have to hunt.

Okay. Here's a place. Harris, November 29, page 52.

BY MR. ANGLAND:

Q Mm-hmm.

A If you look at the note at the bottom of the page.

Q And what does that note indicate?

A It indicates the factor that has got the .09 in it, that he employs in the calculation of what he calls g prime, which is displayed in the graph above.

Q Does that factor of .09 imply that there is 0.9 percent decline, annual decline?

A It would -- you would have to get a calculator out.

Q You compute it works out to be point

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8.6 percent?

A I would have to take a look. Let me get a calculator. It's just a -- the factor is .913 and so on. And maybe if we subtract that from one -- right. You can view that as 8.6 percent factor. But as a multiplicative factor, it's 91 percent. The factor I use is a multiplicative factor of .91.

Q .913 or .914, wouldn't it?

A I've already erased it. I would have to calculate again.

Right, .913, 91.

Q Okay. Now, in your Scenario g2, let me ask you if this is what you are doing here, that is assuming that the real world and the counterfactual world are the same with respect to initiation rate through 1963, but that thereafter they differ in that the counterfactual world initiation rate changes at the rate estimated by Dr. Harris?

A Yes.

Q And then to go back up to Scenario g1, is

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that --
A Wait, by a factor. By the factor that we have just calculated a couple times. It's a multiplicative factor.
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Q Right.
And that's what Dr. -- does that differ from --
A You can employ such a factor in a variety of different ways. In this particular calculation, I employ it -- I don't think I heard you say anything different, but I would have called it a factor. That's the confusion.
When I think of a calculation, I think a multiplicative factor, not something like 8 percent rate. That's maybe another way to look at it. I'm probably just slowing you down here.
What it is is playing with the algebra. It's a multiplicative factor that, even though it looks complicated, it's the number .91.
Q If you go back to the Scenario g1, is that Dr. Harris' scenario?
A No, it's mine. That's all the -- all these three are mine.
Q Okay. There's a handwritten symbol on this page in g1, above the letter g, a tilde or something there. Is -- what does that denote?
A That's just part of the notation to indicate that it's not the same as g. So I could have called it prime, except I used up prime.
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Q And what is g with that tilde notation? What is that defined to be?
A That is defined to be a result of a regression-like calculation. This is the one with the quadratic splines and the knots that uses the Harris method for filling in the missing values on prevalence.
But where I criticize that, because I thought there was an artifact that just didn't square with what I could tell from other sources, I refit it using a slightly different regression, so there wouldn't be such a big bulge at that point where there was no data evidence to suggest a bulge.
And then I call that -- well, that would be a prevalence. But from that you use his different equations to get initiation rates. And so it's the initiation rate that flows from the modified prevalence, I've called it g tilde.
Q Moving down to Scenario g3, what does "yhat" stand for there, the letter y-h-a-t?
A The easiest way to see that one is to look at the picture that I made.
Q Okay.
A So the pages aren't numbered here, but it's the one that says, "g3" at the top.
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Q Okay.
A You will see mine is in color here, but there's the smooth curve that looks like a cubic. You can tell because you have experience with this, I believe.
What I did was just fit a cubic to the points

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that are circled to get a smooth alternative that is lower than the -- let me make sure I got this right. Just a second.

Yeah, that would be the -- a smooth alternative that is smaller than the g tilde numbers reflecting some kind of a reduction or difference in initiation rates. And it's no more than that. It's just a smooth curve designed to lie somewhat below the actuals.

Q On this page, and I'm looking now at the legend, what does "BL" stand for?

A Baseline, I think. It's terminology of Harris.

Q Okay. And is the chart that you depict on here labeled, "Baseline initiation rate," are those numbers right from Dr. Harris?

A No.

Q So it's his terminology, I just want to be clear on this, but it's your counter -- it's your version of what the baseline initiation rate was?

A Yeah, that's right. And some caution. I think

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I've served you well in this environment by making these pictures. But I had them made over the weekend, and I haven't reviewed them carefully, and they are not intended to be my opinions.

But hopefully if they are accurately done, the pictures help explain my opinions. I think -- I don't have any reason to think there's an error in here, but the whole point of them is to just try to depict what I did.

Let me tell you this, then: If in looking at these more closely -- and I have no reason to be concerned, I think, but since I only got them just minutes before I came to see you, if I see any error that would cause a confusion, I'll volunteer to get that to you.

Q Okay. Let's see. If we go back to the first page, there are then four scenarios for quit rates.

A Yes.

Q Actually, before the four scenarios, there's a note about removing the 1964 knot from the quadratic spline. Do you see that?

A Yes.

Q Does that note relate to one -- I'm sorry. I guess that note relates to Scenarios h3 and h4; is that

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right?

A Just a minute.

Yes, that's right.

Q It doesn't relate to h -- let me take that back. I'm sorry.

Let me take h1, trying to figure out the relationship between the -- what I think of as the first of two mathematical columns and the second.

Can you explain that to me, the first one being the one that has "h plus exp(1ny1hat)"? What is that supposed to represent?

A That's why the picture is helpful. We will go to that in a moment.

But there's -- to the right, which is the place to start here, there's a calculation which you will recognize from Harris, where he looks at the difference

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between the number .04, which is his number, I don't create that number, and a baseline quit rate.

Now, the symbol y1 is meant to represent that difference. Because I'm going to have alternatives, I have a y1 and a y2. Y1 is meant to represent that difference.

And then what I do is take that difference and fit a smooth curve to it that allows me to extrapolate,

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and I'll show you a picture of that in a moment. And then it's the results of that smooth curve that I add on to h.

Now, that's why I made pictures, because it was bound to not be clear by just looking at the algebra. So let's look at the picture that has -- well, the first one says, "Counterfactual Quit Rate h1."

You want to turn the page?

Q Yeah. I was just following the math on the first page.

A Okay. So the "Counterfactual Quit Rate h1" in the title, the Baseline h is the lower on the chart of the two, and the top one is the h prime 1, which is made by adding some numbers to h to make a larger number. So there's a higher quit rate.

And if you will turn one more page, you can see what's being added. The ragged, more volatile line on the left, those are the raw differences between .04 and the actual, the Baseline h.

And then I make a smooth curve that goes through that and allow it to extend out into the year 2023, as it's shown on this chart. So I can extrapolate those differences as they decline and according to this convention here. And it's that smooth curve which I add

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to the previous chart Baseline h's to arrive at the curve that's above.

Once you see it, it's easy, but it takes a bit.

Q Okay. Well, I think with your having defined the terms you did, I can follow everything else on the page, so --

A I thought that without doing this, it would be forever mysterious.

Q You probably saved us an hour or so. I applaud your efforts.

In Dr. Harris' model of causation that is designed to determine the conduct attributable fraction --

A Dr. --

Q Harris'.

-- what would you point to as two or three of the most significant problems, in your view? I ask that question because at various times you indicated problems, mainly in the context of Harrison. You mentioned that problems differ in their magnitude or certainty, that it is a problem.

A Yeah.

Q So sitting here, asking for your best judgment of the criticisms you have made of Dr. Harris' model,

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which two or three would you list as being most

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significant?
MR. McCARTER: Objection to form.
THE WITNESS: Well, as I take a step back as you are asking me to do, and I look at the Harris model, the main thing is, in this respect it really differs from the Harrison work, even though qualitatively -- even though the two are on slightly different subjects, there's a qualitative difference in that the Harrison work, to make the contrast, especially when working on the smoking-related disease expenses, has some hope of being -- it's the kind of thing that when you bring an outside reviewer to review, that you get suggestions like the ones that I make, that maybe you should add this and maybe -- here's a problem, trying to sort of improve things.

But you just can't do that with the Harris model, because there's so much of that that just seems to come from just -- spring full-blown from his mind.

Now, he'll -- he says that, well, I've reviewed some literature and here's a number, and so it's not like he's making these numbers completely up. But there's no real easy analytical way to try to come to grips with people who just say, well, I've looked at

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literature and I think .04.

That's a problem. That's a difference, and it's a concern. And I'm not -- I don't -- I'm not trusting of results that have that kind of a basis. And in the same vein, there's an appearance of precision because we got all these difference equations that look complicated, and one can't criticize as to form, but they are not controlling the result.

So that is my main -- take a step back and think about Harris, that although there's some aspects that have a nice ring to them, when you really get done looking through it, it's mostly numbers that come from his mind, as opposed to springing from data sources and being more Harrison-like.

BY MR. ANGLAND:

Q Let's switch over to Dr. Harrison, then, and focus in particular upon his disease-specific model.

With respect to that model, do you have two or three criticisms that you could point to as being the most significant problems with that model?

MR. McCARTER: Objection to form.

THE WITNESS: Well, first on the credit side, we are starting from a better point, because I credit the idea of restricting attention to smoking-related diseases and

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attempting to control, and so I don't want to be all -- a naysayer here.

Again, if you want to take a step back and -- just as you are asking me to do, that the fundamental problem that remains and where not enough attention has been brought to bear, I think, is in model specification.

And this is not unusual. Model specification is the difficult problem of applied statistics in nonexperimental data; omitted variables, functional form and the like. And it can have devastating effects on the quality of the work.

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So, yes, as I'm getting old enough now that I can just take steps back, and I make these broad statements like Dr. Fischer is able to do from his long and illustrious career and vantage point.

And I say, once again, I think specification is probably the place where more attention needs to be paid, less so even than quality of data, I think, although I spend a lot of time talking about that.

BY MR. ANGLAND:

Q Did you say less so or more so?

A Less so. I think -- although I'm glad to have you ask me to take a step back and speak at this

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overview level. And I believe that the percentage of my sentences in my reports do not really reflect the -- necessarily the fundamental import of the thoughts that I'm mentioning now. I probably don't say a lot about this.

You can piece it together from different spots. But having invited me to say it, yes, in this and future studies of this kind, if there is more to be done in future years, I believe -- and there's a big advance here with Harrison compared to, say, the old-style Wendy Max mortality ratio approach.

People are making progress on this. If I were to point to where the weaknesses are, I think it's model specification.

Q That being -- maybe I got a little confused in the answer. I thought you said at one point -- I thought it was inconsistent with the thrust of your answer, but I thought you said that model specification problems were less important than data problems?

A No, the other way around.

Q You meant the opposite; right?

A No. With your invitation to take a step back, and I wanted to try to say, well, is there -- I hadn't expressed this thought before, I haven't discussed it

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with counsel for the defense, but it's been in my mind, I think, and you have -- so it's one word, specification. That's where I think the weaknesses lie, and that includes both functional form and the issue of omitted variables.

Q Do you have an opinion regarding whether information about -- strike that.

Do you have a view regarding whether increases over time and information about the adverse health consequences of smoking has reduced smoking prevalence?

MR. McCARTER: Objection to form.

THE WITNESS: There's a premise there about increased information. And so, first, I haven't done the study of this, but I believe there are other experts that indicate -- and it certainly makes sense to me just from a distance that there hasn't been all that much increased information, that the basic -- what's known to me has been known to others for decades.

So I have a problem with the premise.

BY MR. ANGLAND:

Q Let me go back.

Do you believe that in 1954 American consumers new as much about the adverse health consequences of

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smoking as they do today?
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A No. I think from '54 compared to, say, mid '60s, there was real scientific and statistical learning about associations that brought some greater precision to the issue as -- even though the analysis of association has its limitations.

I think there was some advances there, but they were pretty widely publicized at that time. I was thinking back to at least the mid '60s, that I don't see anything fundamentally new from that point.

Q You don't see anything new in terms of the public's perception of the risks of smoking from roughly the mid '60s to the present?

MR. McCARTER: Objection to form.

THE WITNESS: No, I don't see anything new -- I didn't mean that. I meant that I don't see anything new about what information was publicly available. How people perceive it is, I guess, another matter. I don't have comments about that. But what was generally available in a widespread way.

BY MR. ANGLAND:

Q Well, haven't techniques of estimating impacts of smoking become more sophisticated from the mid '60s to the present?

MR. McCARTER: Objection to form.
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THE WITNESS: Not really. I don't think there's been much of an advance. I think the methodologies that are in play today are pretty much the same as one sees back in the '60s.

BY MR. ANGLAND:

Q Was there a lot of multiple regression work in the '60s on this issue?

A No, but that is not the methodology. It's just the -- speaking to your question, it's -- which is how I take you to mean when you say, "this issue," I'm -- I think the question and the issue was just elevated levels of mortality for different groups of people, especially smoking groups of people. And that really is a relative risk calculation and not a regression calculation.

Q Well, one can use regression in the context of relative risk analysis, can't you?

A People don't do it. You could. You could do Poisson regression or something like that. But I think the plain vanilla relative risk is pretty much the convention for that. And the only real quarrel I have with that number -- leaving aside faulty interpretations of the number, but the only real quarrel I have is I'm not confident that the age standardization scheme is the
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best that it could be.

Q Now, you mentioned, I believe, or maybe I just read it in your report, that you were a reviewer for certain statistical journals?

A Yes.

Q For what journals do you act as a reviewer?

A Well, let me split that into two pieces. There's an editorial role, which is an appointed role as

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a member of the editorial board or even as member, say, of the management committee for a journal.

And then there's a second issue of just being a referee.

Q Okay. Let's limit ourselves for the moment then to the positions, however you describe them, above being a referee.

Which journals have you served such functions for?

A The Journal of the American Statistical Association and the Journal of Business and Economic Statistics are the two journals where I have been on the editorial board.

Q Let's talk about the Journal of the American Statistical Association.

Is that a respected journal?

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A Yes. It's, I think, the premier statistical journal in the world.

Q What makes it the premier journal in the world?

A I think it's my impression of a consensus opinion that you would have if you talked to others, but it would have this result. If you had a really important new finding in statistics that was so terrific that you were confident that it could be published by passing the editorial review process of any journal at all because it's so good, you would almost certainly choose that journal.

Or you might choose the Annals, if it was a really highly mathematical thing. But for most work you would probably choose that journal, because you figure it would get the greatest publicity, it would be read by the people you wanted to read it.

All serious university faculty in statistics are reading the journal every time it comes out. So it's prominent in that respect.

Q Let's talk for a second about Wendy Max's approach to computing damages. One of the issues you raise with respect to her report is that she assumes -- and she states it explicitly, I believe, or let me phrase it another way. She uses mortality relative risk

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as a proxy for expenditure relative risk.

First of all, would you agree that's what she does?

A Maybe I'd say it in a more strong fashion. She uses it as if the two are the same.

Q Okay. And I take it you don't -- from your report, you don't believe that assumption is reasonable?

A I do not believe it's reasonable and I'm not the only one. I think --

Q Well, for the moment, I just want to focus on your views.

A Well, I'll be short, but I just want to indicate so it's not -- you won't say that I didn't alert you.

I think there may be in some of the deposition notes that I've taken places where other experts have agreed with me on that.

Q Okay. Now, for the diseases that Wendy Max addressed in her report, do you have a view regarding

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whether -- regarding whether the mortality relative risk of those diseases taken collectively is greater than, equal to, or less than the expenditure relative risk for those same diseases?
A My view is it's less than, by a lot.
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Q I want to make sure that I don't take advantage of a slip of the tongue here.
A I mean the mortality relative risk would be higher than the expenditure relative risk.
Q Okay. Which I think is the reverse of the last statement.
A Sorry.
Q I understood that from --
A Context.
Q -- from your tone, if nothing else.
Let's take a particular disease. Essentially the premise of Wendy Max's approach with respect to lung cancer is that a smoker who has lung cancer will on average have about the same amount of expenditures as a nonsmoker who has lung cancer, at least as far as the lung cancer treatment is concerned. Is that what her math does?
MR. McCARTER: Objection to form.
THE WITNESS: No. No. I think that is not what her math does.
BY MR. ANGLAND:
Q Actually, let me refine my own question.
That a -- she assumes that if -- to pick an arbitrary number, I'm not purporting to recall her
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precise numbers, that if a smoker is seven times as likely to die from lung cancer as a nonsmoker is, that smokers will have seven times the lung cancer treatment expenses as nonsmokers. Is that how you understand she proceeds?
MR. McCARTER: Object to form.
THE WITNESS: No. I think that oversimplifies.
BY MR. ANGLAND:
Q Okay. Which respect does it oversimplify?
A Well, let me -- we are switching from experts to experts here, so I'm going to pause to take a look here at what I got on the mortality ratio method and just refresh my thinking on this.
Okay. Let me -- perhaps you can ask a fresh question. I just reviewed a couple pages here.
Q Sure. And I'm not going to try to mimic one of my earlier ones. I'll keep trying different formulations, see how close I can get.
A Okay.
Q Wendy Max's approach assumes that if smoking causes a certain percentage of the deaths due to a particular disease, that it also causes that percentage of the expenditures due to that disease; is that correct?
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MR. McCARTER: Object to form.
THE WITNESS: That's not how I understand what she's done. It's true that she's equated mortality relative risk to expense relative risks. But the mortality

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relative risks are not to be interpreted as the percent of disease caused by the various factors.

So that's one of the important problems here, is that the same confounding that is -- that Dr. Harrison is trying to deal with, she's not trying to deal with. And therefore, she doesn't have the thing that you would like to have that's in your question about the percent of cause of the disease.

BY MR. ANGLAND:

Q Now, Dr. Max uses the mortality ratios from the surgeon general's 1989 report; correct?

A And others, yes.

Q And I understand that you question what those mortality ratios really show, given that you think they didn't -- there wasn't enough control for confounding.

Is it fair to say that you question the extent to which they show causality?

A Of course. I don't know -- I assume that we all agreed to that one. I'm going to refer once more, but -- I don't want to take your time, but in my notes

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here from other folks, I believe that on some of these points that I'm answering with my opinion, that you will find that I'm not the only one. But then I won't refer to them every time because you have them, and I don't need to do it.

Q No need to refer to them. I'm reading other stuff in the case too. Right now --

A I'll stop doing that. I don't think I'm the only one that believes that.

Q Right now I'm just trying to find out what you believe, not whether you are the only one who believes it.

A Okay.

Q Let's take the following example: Let's assume a smoker is diagnosed as having lung cancer and simultaneously a nonsmoker is diagnosed as having lung cancer. Do you have a view regarding whether one or the other of those is likely to have the greater cost for treating lung cancer?

A No. That might be a similar number. That's not the crux of the problem.

Q Well, I'm trying to break the problem out to elements.

A Yes.

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Q And I picked lung cancer there. If I switched to another form of cancer, would your answer be different?

A I think I wouldn't have a different answer, because I understand the question to be that we are really comparing like to like, as far as the disease is concerned, and it just has a difference that one person is a smoker and one person is not.

So I would expect, if we trim things down to that like-to-like comparison, two people, essentially identical diseases, there would be similar costs.

Q And that would be true for the other diseases on the surgeon general's list in the 1989 report?

MR. McCARTER: Objection to form.

THE WITNESS: I would think so.

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BY MR. ANGLAND:
Q Okay.
A But that if you have those conditions met.
Q Okay. Now, do you have a view regarding whether -- if two different people, one a smoker, one a nonsmoker, are diagnosed as having lung cancer, do you have a view regarding whether one of them is more likely to die of lung cancer than the other?
A I guess it would depend on other factors that

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are not in your question, so I don't know.
Q If we now try to evoke the law of large numbers.
A No.
Q I'll try. If you answer, you can't say, that's fine. I don't know if you are picking upon the fact that I said one person.
A No. That wasn't what I -- may I explain my hesitancy?
Q Sure.
A I suppose -- I'm not an expert as a doctor of medicine, but I suppose there's different kinds of lung cancer, different stages in which it's being detected.
So if you say one person has lung cancer and another person has it, it may well be that one person has a really bad kind, and another one -- I suppose it's all pretty unpleasant, but the other one might not have it quite as bad, and it's not in your question about that.
Q Well, and given that I haven't specified those things, can you tell, or do you have an opinion regarding whether the smoker or the nonsmoker would be likely to have the greater amount of expenditures?
A No, I would have to know more.

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Q Okay. For example, as you sit here, you don't know that smokers always tend to get the more or the less troublesome form of lung cancer?
A Expensive, I guess you would want to say.
Q Fair enough.
A Yeah, I don't know that.
Q Okay. And would the same be true for the other categories of disease on the surgeon general's list?
A Yes. It's true that I don't know -- well, I don't want to adopt that it's a fact. I -- it may be true, it may not be true that smokers, when they have a broken bone, always get a worse broken bone than somebody else. That doesn't seem likely, but I can't tell you one way or another.
Q I was limiting myself to the surgeon general's list.
A Or any particular thing on the surgeon general's list. I was just using, I guess, a bad example.
Q Okay. And lastly, in terms of breaking this down into its elements, do you have a view regarding whether a smoker, we will start with lung cancer, is more likely to die of it than a nonsmoker with lung cancer?

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A No. I assume it will depend on the particular facts of each case.
Q And is the same true for the other diseases on the surgeon general's 1989 list, that is that you don't have a view as you sit here as to whether a smoker who is diagnosed with whatever the condition is or a nonsmoker who's diagnosed with that condition will have a higher likelihood of mortality?
A I think it would depend on other factors that aren't in your question.
Q And so as you sit here, you don't -- you don't know whether the probability -- whether -- given the real world the way it is, whatever distribution of confounding factors are out there, you don't know offhand whether smokers who are diagnosed with one of those diseases will have a higher probability of dying of that disease than a nonsmoker?
A I think it would depend on other factors that are not stated in your question.
Q Okay. If I stated factors, would that enable you to answer the question?
A It would depend on what you stated. I don't know. You will have to try it.
Q Well, is there some set of data that I could
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provide you that would let you answer that question?
A Oh, I could study that, yes. Within the limitations of -- I don't know as I sit here exactly how to go about it, because I would have to look at a dataset from this point of view.
But I'm certainly qualified to study those questions, but I can't -- you are asking me sitting here without having done a study and with a question that doesn't elaborate a lot of details that would be important how to -- and you asked me to answer that, and I say I can't answer it.
It's not my failing in the long run, because I can study those things, but I certainly can't answer the question as it's put.
Q In fairness to you, I didn't mean to ask you whether you could sit here and give me the algorithm you would use right now.
What I was really asking is, is there some fact I can put in my hypothetical that would permit you to answer it?
And I'll give you an illustration. I didn't specify whether the person was male or female, and that, if I just told you that, you would be able to go, aha, well, now I can tell you the answer.
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Can I, by flushing out my hypothetical, permit you to answer the question? Or to phrase it another way, are you aware of data that would permit you, if I just give you the hypothetical now, to answer the question?
MR. McCARTER: Objection to form.
THE WITNESS: No, I can't answer it now.
BY MR. ANGLAND:
Q Okay.
MR. ANGLAND: Off the record.
THE VIDEOGRAPHER: Going off the videotape record.

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The time is 1:45 p.m.
(Recess taken.)
THE VIDEOGRAPHER: We are back on the videotape record at 1:46 p.m.
(Plaintiffs' Exhibits 5, 6 and 7 were marked for identification by the court reporter.)
BY MR. ANGLAND:
Q Let me first do a little housekeeping here. I will ask you to identify a document that I have marked as Wecker Deposition Exhibit No. 5.
A Okay. This is my notes on having reviewed the depositions of some individuals who are named within the notes.
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Q I now ask you to identify what has been marked as Wecker Deposition Exhibit No. 6.
A These are my notes of a conversation I had with Dr. Mayer.
Q Is that the conversation you referred to earlier in the deposition?
A Yes. It's a telephone conversation on the 18th of July, this year.
Q And I'll ask you to identify what I have marked as Wecker Deposition Exhibit No. 7.
A This is an index to some of the tabs in my notebooks with rather cryptic pointers to earlier tabs when there's an updating connection that is helpful to know.
Q Okay. Will you take a look at Exhibit No. 7. And am I right -- and I may be repeating what you just told me -- that the tabs referenced here are different categories or tabs in the most recent CD-ROM or other electronic media that you have sent to us roughly a week ago?
A Yes.
Q Okay. I'm not going to require you to go through each of the tabs, so just bear with me. Some of them, I think, are -- at least the description is
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self-explanatory.
With respect to Tab No. 40 --
A Just a moment. I want to get it.
Q Sure.
A Okay.
Q I understand that -- is it correct that this tab replicates the SAF values that Dr. Harrison computes, I believe, in his Table 26R?
A Yes.
Q Were you able -- did you get the same numerical answers that he did?
A Just a moment. Where I attempted to replicate I put "replicate." There's also -- here I printed out greater detail than you would see in his report.
Q Okay. Tab 41, I believe, deals with the analysis of car accidents; is that correct?
A Yes.
Q Does this differ in any respect from your prior analysis, which I think was in Tab 27 of your old binder --
A Right.
Q -- other than in using the revised coefficients

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that Dr. Harrison estimates in his revised report?
A Well, I would have to compare them exactly,
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but -- just a moment.
There's no difference in the methodology other than swapping in the Harrison new work. I'm looking here at the first two pages, and I see different categories. And I would have to double-check that I calculate exactly those same categories. But you are correct that that's the method, I've used Harrison's new coefficients to do this.
Q Do you in Tab 41 do something different in terms of breaking the analysis down by ever-smoking status, something different from what you did previously?
A Yes. I see it says -- that's why I guess I should have compared the two directly. I have a note here that -- it will be in your copy, because I'm going to leave these with you. And it says, "Adds a breakdown by ever-, never-smoking status."
So I guess that would be an additional thing that wasn't in the earlier tab.
Q Okay. I can't recall if I asked about this earlier in the deposition, but Tab 42, I believe, contains something regarding injury and poisonings?
A Yes.
Q Was that in your earlier analysis?
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A No. It's -- I guess we would call it an update, in quotes. It's in the same spirit as the car calculation, but I've elaborated it to include some other things that are of the same kind, at least from the point of view of this calculation are the same kind.
Q What SAF do you get for injury and poisonings?
A My eyes are getting tired. Read 5.15, it looks like.
Q Now, is that a SAF for expenditures or a probit SAF?
A That's expenditures.
Q Okay. On Tab 43 relating to mental disorders, I believe when you updated your old Tab 15 you again add, "Add breakdown for ever-smoking"; is that correct?
A Yes.
Q Did you do anything else differently from your old Tab 15 other than using the new data from Dr. Harris?
A I think -- the titles indicate some additional stuff. I'm just reading the titles on page 3. It says, "Adding social post, insurance, and mood variables and age/gender interaction." So I elaborated that analysis with some control for confounding.
Q I'm sorry. I just want to make sure I follow
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this. This is still talking about the computation regarding mental disorders? Are we on Tab 43 here?
A Yes. Yes. It's still talking about mental disorders. Tab 43, the first page is sort of straightforward, and then if you have to move to page 3, and you will see that it's the same calculation with some additional controlling.

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Q Okay. This was one of -- this file -- and there may be some other ones where we had difficulty running what we received just last week, which is why you haven't heard about it earlier.

I take it -- in particular I think the understanding here is we need a particular sas data file, a-d-n-m-e-s-d-s, which I don't think we have. If we do, I'm sorry.

A Can I ask you to send a letter.

Q What I was about to say is, I don't expect you to have it in your back pocket to hand me, that I'm just really giving you a heads-up that in order to replicate some of the stuff, we are going to need some things from you.

A Tell me again.

Q A-d-n-m-e-s-d-s. But I will put these in writing, and I don't expect you to --

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A Yes. And we will attend to it promptly.

Q What does Tab 44 do?

A It -- well, in the first instance, it updates Tab 28, so that's a connection to know. And it -- the nature of the updating, on page 1 I'm looking at here, is to bring in the new Harrison model coefficients. I'm pausing, but I'm not quite finished.

And it's going to give some SAFs by ever-, never-smoking status, current, former and various definitions of former. So you have to look at different places. I see here on the third page there's a SAF there that would be for passive smoking. It's described in the title, so it should be easy to find.

Q In Tab 46 there does appear at least to be some new files that were not in the tab that was being updated. One is called damages.bas.

A Could you say that again.

Q In Tab 46 -- well, actually, one is damage.bas. Is that a file from Glenn Harrison?

A Sure. The .bas's are basic files, and you don't use that, except when I use his.

Q And is the same true of ca70d.bas?

A All the .bas's will be Harrison, because he's the only one writing in basic.

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Q What do you use ca70d.bas for in Tab 46? What does it do there?

A I'm just printing it out. This is the details of what happens if you execute his program.

Q Do you use that for anything?

A Well, in -- probably in the first instance, no. Just -- I'm in the process of exploring this new work, and one of the first things you have to do is print it out and take a look at it.

But I have some handwritten notations on here, and I'll see if any of them start to rise to the level of a point. Most of my notations are my tracings trying to figure out how the columns work so that one column is the product of two others. I've figured that out and made notations to that effect.

On page 2 -- well, I guess I should stick with page 1 for the -- well, on page 2, I've made an observation here that there's some numbers where the

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disease-specific damages are greater than the total damages. That's not reasonable and I was noticing that.
And there's a factor that appears here that I haven't understood -- factor 1.404, which -- this appears in Harrison's work for the first time, and he hasn't explained that. Because there's no report on
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this that explains that, so I'm trying to figure that out.
Q What factor are you referring to here? You said it was 1.404?
A Just a multiplication factor that appears here without explanation.
Q Where does it appear?
A You can see it in the Tab 46 printout of Harrison's basic program.
Q Which page?
A First page.
Q Can you tell -- forgetting about why it's in there, can you tell me what it does in there?
A Just increases things by 40 percent. It would have the effect of increasing the damages by -- I think it would just flow through linearly eventually to damages.
So you find me in the state of analyzing his work rather than completed reports. Even though I'm in the middle of it, I see some things that are -- that seem bothersome.
Q Looking at the page that has the heading, "ca70d.bas" --
A What page is that?
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Q I'm not sure if my printout corresponds to yours. I have --
A Ca70 --
Q D.bas.
A I'll see if I can find it.
Q I can show you the page. I'm not convinced it will be printed out in the same way in your sheets.
A Well, it's helpful. Let me look here and see if -- I've got a program that looks like that, but it has a different name. Okay.
What is your question? Oh, I found it.
Q Okay. I was just trying to understand some of the notation in the code.
A You have to talk to Dr. Harrison; it's his code.
Q Actually, that's what I was going to ask. I had not realized this had originated with him. So, for example, the line "ca89 times 1970," that would have been Dr. Harrison's code?
A Where is that?
Q (Indicating.)
A Thank you.
Right. I may have some print statement that I've inserted in here, but I hadn't intended to change
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any of the substantive code.
Q Okay.
A May I abuse my position and ask a question?

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Q Sure.
A If you can help us figure out what 1.404 is about, I would appreciate it, because I have a feeling we will never get to the bottom of that without a deposition.
Q One thing I can tell you is I don't know for sure as I sit here.
A You have been very kind, and I shouldn't take advantage.
Q Tab 51, let's jump ahead to that. There are again some files that, at least at first glance, we didn't find in the old file that this was updating. One is das_cat1.sas.
A Just a moment please. Again?
Q Das_cat1.sas.
A Okay.
Q Do you know what that file is or does?
A No. No. That's just an acronym. Doesn't do anything to me without looking for it.
Q Okay. And likewise injury.sas?
A You suspect these exist and were in use, but

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weren't supplied, is that --
Q No, I think these were actually supplied, but they didn't appear to be in the old CD-ROM that you had sent us. So we are trying to find out what new is going on here.
A Oh, I misunderstood. Okay. Well, let me look. And it's in Tab 51?
Q Yes.
A Okay. Let me see what I have here.
I can give you an overview, and maybe we can connect up programs by flipping through more pages. In this tab, I do the calculations where I split the parent smoking history into the long ago, before the kid was born, and the more recent period. So that's being done in this section.
Q Is that in one of the files that I just mentioned to you?
A Well, I haven't turned enough pages yet to find the file name, but I'm just giving you an overview of what I'm doing in this tab.
Q Okay.
A The other thing is, I have a calculation of injury and mental expense in the same spirit as I've done it elsewhere, but for kids here.

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Now, let's see.
Q Is that a new analysis here?
A Yes, I think that's new.
Q So --
A I have a note here that is a note for you to have that says that the injury expense is on page 17. I've numbered the pages, so let's turn to 17EE.
And that is the output of that injury dot output program. When you see, "injury.lst," that tells you it's the printout of .sas. Those are injury expenses for kids and occurrence of injury as well. That's that probit output.
Q Do you subscribe to any medical journals?
A No. I read them. From time to time I read

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articles in medical journals, but I don't subscribe to the journal.

Q Which medical journals do you read articles from on a somewhat regular basis? I realize you might read an article, an odd article from any journal.

A It's really an odd article. Like The New England Journal of Medicine is a place where important articles are printed, and sometimes they come to my attention; I'll review them.

Q Let me ask you first, is there anything that

you want to add, anything that you have remembered that you wanted to add to any of your prior answers?

A I don't think so, but give me a moment so that I -- no, I think not. I've tried to clarify everything as best I could.

Q Okay. Well, I thank you for your time, Dr. Wecker, and I have no further questions.

MR. McCARTER: I don't have any questions.

MR. ANGLAND: We are adjourned.

THE VIDEOGRAPHER: This concludes today's proceedings in the deposition of William Wecker. The number of videotapes used is two. We are going off the videotape record at 2:07 p.m.

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I, WILLIAM E. WECKER, Ph.D., do hereby declare under penalty of perjury that I have read the foregoing transcript; that I have made any corrections as appear noted, in ink, initialed by me; that my testimony as contained herein, as corrected, is true and correct.

EXECUTED this _____ day of _____, 2000, at _____, _____.

(City)

(State)

_____

WILLIAM E. WECKER, Ph.D.

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STATE OF CALIFORNIA) :ss
COUNTY OF SAN FRANCISCO)

I, the undersigned, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a verbatim record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

I further certify that I am neither financially interested in the action nor a relative or employee of any attorney of any of the parties.

IN WITNESS WHEREOF, I have this date subscribed my name.

Dated: _____

_____

RACHEL FERRIER

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